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An Update on the CH-53K: January 2021



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What if it was called the CH-55?

Transformation in the Vertical Heavy Lift Fleet

12/08/2020

By Robbin Laird

To the casual observer, the Super Stallion and the King Stallion look like the same aircraft.

One of the challenges in understanding how different the CH-53K is from the CH-53E is the numbering part.

If it were called CH-55 perhaps one would get the point that these are very different air platforms, with very different capabilities.

What they have in common, by deliberate design, is a similar logistical footprint, so that they could operate similarly off of amphibious ships or other ships in the fleet for that matter.

But the CH-53 is a mechanical aircraft, which most assuredly the CH-55 (aka as the CH-53K) is not.

In blunt terms, the CH-55 (aka as the CH-53K) is faster, carries more kit, can distribute its load to multiple locations without landing, is built as a digital aircraft from the ground up and can leverage its digitality for significant advancements in how it is maintained, how it operates in a task force, how it can be updated, and how it could work with unmanned systems or remotes.

These capabilities taken together create a very different lift platform than is the legacy CH-53E. In a strategic environment where force mobility is informing capabilities across the combat spectrum, it is hard to understate the value of a lift platform, notably one which can talk and operate digitally, in carving out new tactical capabilities with strategic impacts.

The lift side of the equation within a variety of environments can be stated succinctly. The King Stallion will lift 27,000 lbs. external payload, deliver it 110 nm to a high-hot zone, loiter, and return to the ship with fuel to spare. What that means is JLTV's (22,600-lb.), up-armored HMMWV, and other heavier tactical cargos go to shore by air, rather than by LCAC or other slower sea lift means. For less severe ambient conditions or shorter distances than this primary mission, the 53K can carry up to 36,000 lbs.

With ever increasing lift requirements and advancing threats in the battlefield, there is no other vertical lift aircraft available that meets emerging heavy lift needs. There are a lot of platforms that can blow things up or kill people, but for heavy lift, the CH-53K is the only option.

For the Marines, this is a core enabling capability. The CH-53K is equipped with a triple external hook system, which will be a significant external operations enabler for the Marine Air Ground Task Force. The single, dual and triple external cargo hook capability allows for the transfer of three

independent external loads to three separate supported units in three separate landing zones in one single sortie without having to return to a ship or other logistical hub.

The external system can be rapidly reconfigured between dual point, single point loads, and triple hook configurations in order to best support the ground scheme of maneuver.

All three external hooks can be operated independently supporting true distributed operations. For example, three infantry companies widely dispersed across the battlefield can be rapidly resupplied with fuel, ammo, water or other supplies directly at their location—during the same sortie—eliminating the requirement for the helicopter to make multiple trips or for cargo from a helicopter to be transloaded to ground vehicles for redistribution—saving ground vehicle fuel and MAGTF exposure to ground threats.

The CH-53K's triple external hook system is a new capability for the Marine Corps and an improvement in capability and efficiency over the legacy aircraft it replaces making it a game changer for providing heavy lift in support of combat, humanitarian assistance, and disaster relief operations, notably in a distributed operational space.

The CH-53K design integrates the latest technologies to meet the USMC requirement for triple the lift of the predecessor Super Stallion while still maintaining the size and footprint to remain compatible with today's ships and strategic air transport platforms.

The aircraft is fully marinized for shipboard operations, including automatic blade fold and design robustness to meet new and extreme requirements for salt-fog and corrosion. It is already certified for transport in C-5 (2 x 53Ks) and C-17 (1 x 53K) aircraft and also includes an integral aerial refueling probe for long range missions or self-deployment.

The work process is very different as well, because of support for palletization. This may sound like logistic geek language, but it is about speed to deliver to the force for its operating efficacy. Given that speed to operation is a key metric for supporting the strategic shift from the land wars to full spectrum crisis management, the CH-55 (aka as the CH-53K) is a key enabler for the new work flow essential to combat success.

The digital piece is a foundational element and why it is probably better thought of as a CH-55. This starts with the fly-by-wire flight controls. The CH-53K is the first and only heavy lift fly-by-wire helicopter.

The CH-53K's fly-by-wire is a leap in technology from legacy mechanical flight control systems and keeps safety and survivability at the core of the Kilo's design while providing a portal to an optionally piloted capability and autonomy.

The CH-53K's fly-by-wire design drastically reduces pilot workload and minimizes exposure to threats or danger, particularly during complex missions or challenging aircraft maneuvers like low light level externals in a degraded visual environment allowing the pilot to manage and lead the mission vice focusing on physically controlling the aircraft.

The fly-by-wire design further complements safety and survivability through physically separated Flight Control Computers, separated cockpit controls with an Active Inceptor System, and load limiting control laws that will extend component lives. Other cargo Helicopters originated in the late 50s/early 60s, predating the emergence of Aircraft Survivability as an engineering discipline.

Not leaving anything to chance, the overall CH-53K survivability process includes an extensive, ongoing Live Fire Test Program, which started at a component level, and culminates with a full-up aircraft test with turning rotors. The CH-53K is the only heavy lift helicopter designed from the ground up to survive in battle, reflecting a 21st century level of survivability.

In addition, the CH-53K was designed from the start in an all-digital environment, taking advantage of virtual reality tools to optimize both manufacture and support of the aircraft throughout its life cycle. Fleet Marine personnel were engaged from the beginning of the design process to ensure the aircraft was designed for supportability and reduced O&S costs—from component access, support equipment, animated work instruction and electronic publications to the system integration with Sikorsky's fleet management tools that were originally developed to support its commercial S-92 aircraft fleet.

The S-92 has demonstrated greater than 95% availability for a fleet of over 300 aircraft which now boast near 1.5 million flight hours, in harsh North Sea and other offshore Oil & Gas environments. Use of data analytics ("big data") has proven to save money in the commercial fleet and these same tools are already in place for the CH-53K and being proven on the CH-53E in the interim.

The CH-53K's triple redundant fly-by-wire design improves maintainability significantly through fault Detection and isolation capability providing the ability to detect failures in actuators and other electrical and electromechanical components including hydraulic leak detection with fault isolation.

While the CH-53K is bigger and far more capable in many important ways, it's also smaller in terms of its logistics footprint and provides a best O&S value over its entire lifetime. The CH-53K's logistics footprint is 1/3 less by volume with a 5,000 cubic feet reduction and 1/4 less by weight with a 25, 000 reduction compared to the legacy CH-53E. That's equivalent to the storage volume of a 2-car garage and the weight of a two up-armored HMMWVs. In the cargo world, that's 2 standard shipping containers, which is space and available payload on a ship or less equipment to transport to an austere support base.

The design reduces the maintenance workload as well. With no mechanical rigging requirement and fewer moving parts leading to fewer failures, the CH-53K provides a significant reduction in maintenance man hours, a 35% improvement in Mean Time to Repair, and ultimately increased readiness and availability to the warfighter.

Organizational-level maintenance peculiar support equipment for the CH-53K is based on common and CH-53E support equipment in order to reduce the new peculiar support equipment required for the CH-53K. Only 150 items of peculiar support equipment were developed to support organizational-level maintenance, which is 146 less pieces of support equipment or a 52% footprint reduction compared to the CH-53E. Additionally the CH-53K support equipment was designed to reduce and optimize equipment weight and life cycle cost while material selection and coating changes from legacy aircraft to eliminate use of hazardous materials and provide better environmental protection from corrosion.

The T408-GE-400 engine brings more capability to the CH-53K through 57% more horsepower with a smaller logistics footprint compared to the T64 it replaces in the same size package but with 63% fewer parts. The T408 supports engine on aircraft maintenance and was designed to maximize two levels of maintenance—Organizational to Depot—with all on-wing engine maintenance being performed using the common tools in flight line toolbox further reducing the logistics footprint and maintenance man hours while increasing availability and readiness of the CH-53K.

The CH-53K sets the standard and is the 1st and only true 21st Century Heavy Lift Helicopter.

To be more specific, the current heavy / upper medium lift cargo helicopters that the CH-53K replaces—legacy Chinook, CH-53 A/D/G Sea Stallion, CH-53E Super Stallion and their engines—were literally designed in the mid-20th century.

In the more than half century that has elapsed between the design of these legacy aircraft and the first flight of the CH-53K in 2015, there have been significant advancements in helicopter design and manufacturing.

The CH-53K is superior to its predecessors, not by engineering miracles, but by over a half century of steady engineering and technology progress that was designed and incorporated into the CH-53K from the ground up.

The King Stallion is a totally new helicopter that leapfrogs the CH-53E design to improve operational capability, interoperability, reliability, maintainability, survivability, and cost of ownership.

Finally, the CH-53K is nearing completion of testing and well into production. The program remains on target for a 2021 IOC and 2023 deployment that meets the USMC's operational needs. The King Stallion is the only aircraft that meets the heavy lift requirements for the USMC, supports the Expeditionary Advanced Base Operations (EABO) concept, and provides that safety, survivability, supportability and growth capability to meet the service's needs for the many decades to come.

A good sense of how the CH-55 (aka as the CH-53K) intersects with the new operating environment was highlighted in interviews I did in both Pax River and Marine Corps Air Station Yuma.

In an interview earlier this summer with a senior MAWTS-1 officer, we discussed the coming of TAGRS and of the CH-53K to the Marine Corps and how these new capabilities would allow for enhanced FARP capabilities and expeditionary basing support.

In that interview with Maj Steve Bancroft, Aviation Ground Support (AGS) Department Head, MAWTS-1, MCAS Yuma, we discussed the way ahead on FARPs enabled by TAGR and CH-53Ks.

Excerpts from that interview follow:

There were a number of takeaways from that conversation which provide an understanding of the Marines are working their way ahead currently with regard to the FARP contribution to distributed operations.

The first takeaway is that when one is referring to a FARP, it is about an ability to provide a node which can refuel and rearm aircraft. But it is more than that. It is about providing capability for crew rest, resupply and repair to some extent.

The second takeaway is that the concept remains the same, but the tools to do the concept are changing. Clearly, one example is the nature of the fuel containers being used. In the land wars, the basic fuel supply was being carried by a fuel truck to the FARP location. Obviously, that is not a solution for Pacific operations.

What is being worked now at MAWTS-1 is a much more mobile solution set. Currently, they are working with a system whose provenance goes back to the 1950s and is a helicopter expeditionary refueling system or HERS system. This legacy kit limits mobility as it is very heavy and requires the use of several hoses and fuel separators.

Obviously, this solution is too limiting so they are working a new solution set. They are testing a mobile refueling asset called TAGRS or a Tactical Aviation Ground Refueling system.

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Helicopter Expedient Refueling System (HERS)

- Requires 6 Marines



Tactical Air-Ground Refueling System (TAGRS)

- Requires 4 Marines



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As one source put it: “The TAGRS and its operators are capable of being air-inserted making the asset expeditionary. It effectively eliminates the complications of embarkation and transportation of gear to the landing zone.”

The third takeaway was that even with a more mobile and agile pumping solution, there remains the basic challenge of the weight of fuel as a commodity. A gallon of gas is about 6.7 pounds and when aggregating enough fuel at a Forward Air Refueling Point or FARP, the challenge is how to get adequate supplies to a FARP for its mission to be successful.

To speed up the process, the Marines are experimenting with more disposable supply containers to provide for enhanced speed of movement among FARPs within an extended battlespace. They have used helos and KC-130Js to drop pallets of fuel as one solution to this problem.

The effort to speed up the creation and withdrawal from FARPs is a task being worked by the Marines at MAWTS-1 as well. In effect, they are working a more disciplined cycle of arrival and departure from FARPs. And the Marines are exercising ways to bring in a FARP support team in a single aircraft to further the logistical footprint and to provide for more rapid engagement and disengagement as well.

The fourth takeaway is that innovative delivery solutions can be worked going forward.

When I met with [Col. Perrin](#) at Pax River, we discussed how the CH-53K as a smart aircraft could manage airborne MULES to support resupply to a mobile base. As Col. Perrin noted in our conversation: “The USMC has done many studies of distributed operations and throughout the analyses it is clear that heavy lift is an essential piece of the ability to do such operations.”

And not just any heavy lift – but heavy lift built around a digital architecture.

Clearly, the CH-53E being more than 30 years old is not built in such a manner; but the CH-53K is. What this means is that the CH-53K “can operate and fight on the digital battlefield.”

And because the flight crew are enabled by the digital systems onboard, they can focus on the mission rather than focusing primarily on the mechanics of flying the aircraft. This will be crucial as the Marines shift to using unmanned systems more broadly than they do now. For example, it is clearly a conceivable future that CH-53Ks would be flying a heavy lift operation with unmanned “mules” accompanying them. Such manned-unmanned teaming requires a lot of digital capability and bandwidth, a capability built into the CH-53K.

If one envisages the operational environment in distributed terms, this means that various types of sea bases, ranging from large deck carriers to various types of Maritime Sealift Command ships, along with expeditionary bases, or FARPs or FOBS, will need to be connected into a combined combat force.

To establish expeditionary bases, it is crucial to be able to set them up, operate and to leave such a base rapidly or in an expeditionary manner (sorry for the pun). This will be virtually impossible to do without heavy lift, and vertical heavy lift, specifically.

Put in other terms, the new strategic environment requires new operating concepts; and in those operating concepts, the CH-53K provides significant requisite capabilities. So why not the possibility of the CH-53K flying in with a couple of MULES which carried fuel containers; or perhaps building a vehicle which could come off of the cargo area of the CH-53K and move on the operational area and be linked up with TAGRS?

As this potential development highlights, if we called it a CH-55, we would grasp which the coming of the CH-53K has a significant impact on the way ahead for mobile expeditionary basing, which is itself a key building block in the way ahead for the integrated distributed force. Or put another way, multiple basing is a key capability required for operations in the extended but contested battlespace; and the CH-55 can provide a significant capability to enable multiple basing.

Exercise Deep Water: Working the Integrated Distributed Insertion Force

12/31/2020

By Robbin Laird

Last July, North Carolina-based Marines organized an exercise in which they called Deep Water.

In a press release from [November 5, 2020](#), this is how II Marine Expeditionary Force described the exercise:

“Marines with 2nd Marine Division, 2nd Marine Logistics Group, and 2nd Marine Aircraft Wing are conducting Exercise Deep Water at Marine Corps Base Camp Lejeune, N.C., 29 July 2020.

“II MEF conducts these training events on a consistent basis. This year, Exercise Deep Water will see two battalions conduct an air assault in order to command and control many of the various capabilities organic to II MEF in preparation for major combat operations.

“Exercise Deep Water 20 is a great opportunity for the Division to work with aviation units from Marine Corps Air Station New River and the Logistics Combat Element, as well. 2nd Marine Regiment will be the provide command and control over the 2nd battalion, 2nd regiment, and 3rd battalion, 6th regiment, the logistics and aviation units.”

Additionally, 2nd Marine Division provided further details about the exercise in a press release dated [November 5, 2020](#):

“A Regimental Combat Team (RCT) commanded by 2d Marine Division’s 2d Marine Regiment undertook a two-battalion air assault to commence Exercise Deep Water today on Camp Lejeune (CLNC). At nearly double the size of last year’s Exercise Steel Pike, Exercise Deep Water is the largest exercise of its type conducted on Camp Lejeune in decades.

“Exercise Deep Water is a 2d Marine Regiment-planned and led event that incorporates elements from across the II Marine Expeditionary Force Marine Air Ground Task Force (MAGTF). The participating Marines and Sailors will be engaged in a dynamic force-on-force scenario against a “peer-level adversary,” as simulated by 2d Marine Division’s Adversary Force Company.

“Exercise Deep Water, a regimental air assault that utilizes the whole of CLNC and the outlying training areas, will allow us to sharpen our spear and help make us more lethal,” said Col. Brian P. Coyne, commanding officer, 2d Marine Regiment.

“With Marine air (2d Marine Aircraft Wing) serving as part of a robust team that incorporates every element of the MAGTF, this exercise provides an opportunity to display the unparalleled lethality of a well-orchestrated Marine fighting force. As ‘RCT-2’ takes on an independent-thinking adversary, the ability of our squads to shoot, move, communicate, evacuate and employ effective combined arms with excellence will be put to the test.”

“In addition to the air assault, 2d Marine Regiment will be conducting offensive, defensive, and stability operations in multiple urban training settings where both conventional and hybrid adversary forces will be acting against them.

“Exercise Deep Water continues to build upon 2d Marine Division’s priority to build readiness against peer threats, in accordance with both the National Defense Strategy and the Commandant’s Planning Guidance.

“Accepting and embracing the challenge of such a highly-complex event in these trying times is a reflection of our unit’s commitment to remaining prepared for major combat operations or unexpected contingency operations, Coyne said, adding, “Along with the rest of the world, our adversaries are watching to see if we drop our guard; the visible enhancement of 2d Regiment’s combat readiness during Deep Water will help assure our enemies that they should not test our Corps.

“This training event will improve our warfighting proficiency and prepare us for tomorrow’s battles. ‘Tarawa’ (2d Marines call sign) Marines will fight and win if called,” he concluded.”

During my visit to 2nd MAW in the first week of December 2020, I had a chance to discuss the exercise and its focus and importance with Major Rew, the exercise’s air mission commander.

I learned from Major Rew that this exercise combined forces from pickup zones in North Carolina and Virginia.

The exercise consisted of a force insertion into a contested environment, meaning they used air assets to clear areas for the Assault Force, which included both USMC (AH-1Z, UH-1Y, F/A-18A/C/D, and AV-8B) and USAF aircraft (F-15E and JSTARS). Once air superiority was established, the assault force was inserted by USMC MV-22Bs and CH-53Es.

The exercise also included support aircraft such as the KC-130J and RQ-21.

The planning and execution focused on bringing a disaggregated force into an objective area that required integrated C2 with Ground, Aviation, and Logistics Combat Elements.

This C2 functionality was delivered in part by an Osprey operating as an airborne command post with a capability delivered by a “roll-on/roll-off” C2 suite, which provided a chat capability and can be found at a mobile or static command post or even in an airborne C2 aircraft.

The use of MAGTF Tablets (MAGTAB) provided a key means of digital interoperability that allowed for real time information sharing to ground elements and aviators. The MAGTAB provided the visual representation of the integrated effects and outcomes to the command element.

ISR was provided by USMC assets and by a USAF JSTARS aircraft. They used their Network-On-The-Move Airborne (NOTM-A) system to provide interoperability for the commander and assault force.

As Major Rew put it, “I think having the NOTM-A kit on the Osprey is a big win because it provides so much situational awareness. With the Osprey as a C2 aircraft, there is added flexibility to land the aircraft close to whatever operational area the commander requires. There are many capable C2 platforms across the DoD but not all of them also have the ability to immediately land adjacent to the battlefield like the Osprey does.”

One aspect of mission rehearsals the Marines are developing is to leverage Joint assets in support of an assault mission and be able to provide information to that mission force as well.

To be clear, the Marines did not march to the objective area; they flew to their objectives in various USMC lift assets accompanied by USMC rotary wing and fixed wing combat aircraft.

They were moving a significant number of Marines from two different locations, hundreds of miles apart, to nine different landing zones.

As Major Rew explained it, “We were working with a lot of different types of aircraft, and one of the challenges is trying to successfully integrate them to meet mission requirements.”

He added, “As the air mission commander, I was co-located with an infantry colonel who was the overall mission commander. We were in an Osprey for a significant period of time leading the operation from a C2 perspective.”

“In the exercise we sometimes had to solve problems during execution that required rapidly sending information to an asset so that they could complete a crucial battlefield task. We work with commander’s intent from the outset of an operation and this is especially critical during distributed operations.”

The coming of the F-35 to both Air Assaults and Distributed Operations is crucial as well.

According to Major Rew, “They’re an incredible sensor and they have the capability to be able to see what’s happening on the battlefield, assess things real time, and then send that information to the individual who needs to make a decision. Incorporating them into future exercises of this magnitude will be value-added to the entire Marine Corps.”

In effect, the Marines are working on an ecosystem for integrated and distributed force insertion.

As they build out that ecosystem, new ISR, C2 and, strike capabilities that enter the force can be plugged into the ecosystem that will allow for a continued evolution of that system. In that sense, the future is now.

An Update on the CH-53K from VMX-1: The Perspective of Lt. Col. Frank

01/05/2021

By Robbin Laird

During my visit to 2nd Marine Air Wing during the first week of December 2020, I had a chance to visit New River Marine Corps Air Station and meet with Lt. Col. Frank, VMX-1, to get an update on the coming of the CH-53K. Lt. Col. Frank showed me the simulator as well giving me a chance to experience the flying qualities and, notably, the ability to hover via using the automated systems to operate in difficult visual and operating conditions.

He joined the USMC in 2002 and has flown a wide variety of rotorcraft during his career and served as a pilot for the U.S. President under President Obama. He came to VMX-1 in 2018. He has stayed in large part to follow through the CH-53K to fruition, that is into operations.

As he put it: “It is crucial to have a CH-53 fleet that works effectively as it is a unique capability in the USMC crucial for our way ahead operationally. It is the only aircraft we have that can move an expeditionary brigade off of our amphibious ships.”

“We have about a hundred Marines here at the test detachment. We’ve been training our maintainers and our air crew on the 53K for two years now. The maintainers have been working on it since 2018, when we started the logistics demonstration, which is essentially the validation of maintenance procedures on the 53K. I have 10 pilots in the det including myself and I’m responsible for ensuring that everyone goes through the proper training syllabus.”

“All 10 of our pilots in addition to our crew chiefs and our maintainers will be the first unit to be allowed to operate a “safe aircraft for flight,” which is a term we use for the maintainers.

“Our job is to conduct initial operational test and evaluation training for six months, beginning this month and ending in May or June of 2021, where we will establish five aircraft commanders, myself being one of them, five co-pilots, that’ll be our 10 pilots.

“We’ll qualify 10 crew chiefs, and our maintainers will continue to advance in their maintenance quals. In June of 2021 is when we enter into IOC evaluations.”

“We’re going to evaluate the reliability and maintainability of the aircraft. We’re going to collect all our maintenance data, determine how long it takes to fix, how long it’s down before it’s fixed and how many flight hours it accomplishes per maintenance man hour to evaluate it.

“We will evaluate its shipboard compatibility in June and July 2021. We are to evaluate its desert mountainous capabilities in Twentynine Palms, beginning of August and September 2021. And we also have a sorties generation rate demonstration where we will execute a surge capability of sorties from a ship in November 2021; we’ll do that for a period of about 72 hours straight, where we will fly every aircraft every day and see what they deliver.”

We discussed the importance of the fly by wire system in the aircraft, which he considers “very mature.” He did note that the USMC subjects its aircraft to some of the harshest environments in the DoD, “salt spray, open ocean, desert heat and freezing cold.” Robustness is a crucial aspect of determining reliability. “We do not operate runway to runway. We do not store them inside; we use them in challenging conditions.”

He referred to his team as “the learning curve for the CH-53K,” similar to what happened with the Osprey or the F-35B.

He underscored that the aircraft is well along the path to IOC.

“We’ve had a lot of time with the aircraft. Our Marines have been working on it for two years now. During logistics demonstration, we took the publications, which were in their infancy, and we went through every work package.

“The bulk of the Marine Corps’ CH-53K personnel, equipment, aircraft, and support will be located at VMX-1 when the Marine Corps declares the CH-53K program is IOC.”

Lt. Col. Frank described the innovation cycle as follows: “When problems come up with the aircraft, we bring up to the program office, the program office sends it out to engineering and industry. They implement changes. They implement engineering fixes, and they incorporate them.”

While at New River, we visited the first of the CH-53Ks delivered to VMX-1, which I had seen earlier in the log demo program but now was on the tarmac.

LtCol. Frank indicated that VMX-1 is to receive six aircraft overall.

“We are to receive our next aircraft on January, February, June and September of 2021, and the last one on January of 2022. By January 22, when the sixth aircraft is delivered, we should be done with IOT and E and we should carve out a detachment size group of maintainers, pilots, and aircraft from VMX-1 to form the initial cadre of HMM-461.”

How does he compare the Es to the Ks?

“I’ve started in the Ch-53D in 2004, they’re my first love. I’ll always love them.

“They were much harder to fly. And the ease of flying this, the flight control system is probably the biggest game changer for the 53 community.

“We’re not used to anything like this. It’s very intuitive. It can be as hands off as you know, a brand-new Tesla, you can close your eyes, set the autopilot and fly across country.

“Obviously, you wouldn’t do that in a tactical environment, but it does reduce your workload, reduces your stress.

“And in precision hover areas, whether it’s night under low light conditions, under NVGs, in the confines of a tight landing zone, we have the ability to hit position hold in the 53 K and have the aircraft maintain pretty much within one foot of its intended hover point, one foot forward, lateral and AFT, and then one foot of vertical elevation change.

“It will maintain that hover until the end of the time if required. that’s very, very stress relieving for us when landing in degraded visual environments. Our goal at VMX-1 is to create tactics that employ that system effectively.

“Some communities struggle with how they use the automation, do they let the automation do everything? Do they let the pilots do everything? How to work the balance?

“We’re working on a hybrid where the pilots can most effectively leverage automation.

“If you know you’re coming into a brownout situation or degraded visual environment, you engage the automation at a point right before the dust envelops you. And then in the 53-K, you can continue flying with the automation engaged.

“You continue flying with the automation engaged, and you can override it, but as soon as you stop moving the controls, it will take your inputs, estimate what you wanted and keep the aircraft in its position.

“It’s a very intuitive flight control system, and it blends very well with the pilot and the computers. It allows you to override the computer.

“And then the second that you stop overriding it, the computer takes back over without any further pilot input.

“That’s probably the biggest game changer for our community.”

Flying the CH-53K: Visiting Marine Corps Air Station New River

12/03/2020

By Robbin Laird

Marine Corps Air Station, New River.

Yesterday, during my visit to New River, I experienced flying in the cockpit of the Marine Corps’s latest key air capability, the CH-53K. I was in the cockpit with LtCol Luke “Amber” Frank, the VMX-1 Detachment OIC. He is a very experienced Marine Corps pilot having flown virtually every type of rotorcraft the Marine Corps has, including being a presidential pilot as well.

He is experienced; obviously I am not.

So where did this flight happen?

In the new flight simulator, which has been built and is operating at VMX-1.

The man-machine working relationship is a central part of the flight experience, with new capabilities crucial to mission success built around key man-machine capabilities.

A central one is the ability of the aircraft to hover with the automatic system, which allows pilots to operate in very degraded operating conditions to put down their aircraft at desired locations to deliver their payloads.

During our flight, in spite of the bright clear but cold day outside, we experienced several difficult landings in degraded conditions, dust storms, turbulence, and various challenging situations to land the aircraft.

Why does this matter in terms of concepts of operations?

This means that the crew can deliver the payload, Marines or cargo, to the area which is desired in terms of commander's intent with regard to the landing zone selected for maximum combat effectiveness.

If one is inserting a force to support an effort to destroy key enemy capabilities, being able to take the right kind of situational awareness and land EXACTLY where the commander has determined the force could have the highest combat effect is a core combat capability with tactical and even potentially strategic effect.

This is how a capability within a new aircraft translates into enhanced probability for combat success.

And if you are an allied military which needs capability to insert force rapidly in special operations environment, the CH-53K could be a game changing capability for force insertion.

After my CH-53K 'flight,' I toured the first of the VMX-1 CH-53ks on the flight line. What quickly leaps out at you inside the aircraft, is the configuration to manage standard USAF pallets for rapid load and off-load operations.

And in an interview with Sean Cattanach, Sikorsky's senior program manager of the U.S. Marine Corps CH-53K Training System, USNI News reported: "One of the benefits of developing a training system concurrently with the aircraft is that we're able to utilize the digital designs from the aircraft to make sure the training is accurate."

Bill Falk, Sikorsky CH-53K program director, added in a statement: "The training devices will ensure a flawless entry into service for the CH-53K heavy-lift helicopter."

CH-53K Air Refueling: Reach, Range and Impact for the Insertion Force

09/15/2020

Unlike the Chinook, medium lift helicopter, the CH-53K is capable of being refueled while in flight.

If you are looking for speed, range, and heavy lift delivery to an insertion point, the CH-53K is a unique combat asset in the US joint force.

The photos below show the CH-53K King Stallion successfully plugging into a funnel-shaped drogue towed behind a KC-130J during aerial refueling wake testing over the Chesapeake Bay (Pax River, April 6, 2020).

And this refueling capability is part of why the King Stallion is an important capability when considering how to get to the fight with the right kit, at the right time and to make a combat difference.

It is not about building Walmarts any more such as in the Middle East land wars; it is about shaping effectively crisis management events.

In the German case, we looked at how to compare the Chinook and the CH-53K for the German forces, and the two offer very different options and capabilities.

As we pointed out in a comparison of the two platforms as options for the German forces:

If this was the Cold War, where the primary focus was really upon moving support around Germany to reinforce the direct defense of Germany, then there might be a compelling case for the legacy Chinook.

But that is not what Germany is facing in terms of the return of direct defense in Europe.

In our forthcoming book, The Return of Direct Defense in Europe: Meeting the 21st Century Authoritarian Challenge, we focus on the major challenges facing the allies in terms of defense against the Russians in terms of the Poland-to Nordic arc. Within this arc, the challenge is to move force rapidly, to reinforce deterrence and to be able to block Russian movement of force.

Germany faces the challenge of reinforcing their Baltic brigade, moving rapidly to reinforce Poland, and to move force where appropriate to its Southern Flank. In the 2018 Trident Juncture exercise, German forces moved far too slowly to be effective in a real crisis, and it is clear that augmenting rapid insertion of force with lift is a key requirement for Germany to play an effective role.

This is where the CH-53K as a next generation heavy lift helicopter fits very nicely into German defense needs and evolving concepts of operations. The CH-53K operates standard 463L pallets which means it can move quickly equipment and supply pallets from the German A400Ms or C-130Js to the CH-53K or vice versa.

This is not just a nice to have capability but has a significant impact in terms of time to combat support capability; and it is widely understood that time to the operational area against the kind of threat facing Germany and its allies is a crucial requirement.

With an integrated fleet of C-130Js, A400Ms and CH-53Ks, the task force would have the ability to deploy 100s of miles while aerial refueling the CH-53K from the C-130J.

Upon landing at an austere airfield, cargo on a 463L pallet from a A400M or C-130J can transload directly into a CH-53K on the same pallet providing for a quick turnaround and allowing the CH-53K to deliver the combat resupply, humanitarian assistance supplies or disaster relief material to smaller land zones dispersed across the operating area.

Similarly, after aerial refueling from a C-130J, the CH-53K using its single, dual and triple external cargo hook capability could transfer three independent external loads to three separate supported units in three separate landing zones in one single sortie without having to return to the airfield or logistical hub.

The external system can be rapidly reconfigured between dual point, single point loads, and triple hook configurations, to internal cargo carrying configuration, or troop lift configuration in order to best support the ground scheme of maneuver.

If the German Baltic brigade needs enhanced capability, it is not a time you want to discover that your lift fleet really cannot count on your heavy lift helicopter showing up as part of an integrated combat team, fully capable of range, speed, payload and integration with the digital force being built out by the German military.

It should be noted that the CH-53K is air refuelable; the Chinook is not.

And the CH-53 K's air refuelable capability is built in for either day or night scenarios.

A 2019 exercise highlighted the challenge if using the Chinooks to move capability into the corridor.

In the Green Dagger exercise held in Germany, the goal was to move a German brigade over a long distance to support an allied engagement. The Dutch Chinooks were used by the German Army to do the job.

But it took them six waves of support to get the job done.

Obviously, this is simply too long to get the job done when dealing with an adversary who intends to use time to his advantage. In contrast, if the CH-53K was operating within the German Army, we are talking one or two insertion waves.

And the distributed approach which is inherent in dealing with peer competitors will require distributed basing and an ability to shape airfields in austere locations to provide for distributed strike and reduce the vulnerabilities of operating from a small number of known airbases.

Here the CH-53K becomes combat air's best friend. In setting up Forward Operating Bases (FOBs), the CH-53K can distribute fuel and ordnance and forward fueling and rearming points for the fighter aircraft operating from the FOBs.

Being a new generation helicopter it fits into the future, not the past of what the Bundeswehr has done in the Cold War. It is not a legacy Cold War relic, but a down payment on the transformation of the Bundeswehr itself into a more reactive, and rapid deployment force to the areas of interest which Germany needs to be engaged to protect its interests and contribute to the operational needs of their European allies.

US Navy Signs Contract for Delivery of Additional CH-53Ks: LRIP Lot 4 Contract

11/24/2020

A press release by NAVAIR dated October 27, 2020 highlighted their recent contract signing with Sikorsky with regard to the CH-53K.

NAVAL AIR STATION PATUXENT RIVER, Md. A contract to build six CH-53K King Stallion helicopters was signed this week between the Naval Air Systems Command (NAVAIR) and Sikorsky Aircraft, a Lockheed Martin Company.

The Low Rate Initial Production (LRIP) Lot 4 contract, which was signed October 26, is for just over \$550 million. The contract delivers the six aircraft in early 2024 as part of a 200-aircraft program of record for the U.S. Marine Corps. This contract award also includes funding for programmatic and engineering support and rate tooling.

“This contract award is a testament to the government’s confidence in the CH-53K platform. This award shows that we are working hard to make the aircraft more affordable,” said Major General Greg Masiello, program executive office, air ASW, assault and special mission programs. “The capability and affordability of the CH-53K is important to ensure that we provide a valuable addition to the United States Marine Corps and our friends and allies.”

The program is moving toward completion of developmental test in support of Initial Operational Test and Evaluation (IOT&E) in 2021. To that end, the Marine Corps is in the process of accepting the first operational test aircraft configured for Initial Operational Capability. It will be used for initial CH-53K operator and maintenance training in support of the CH-53K, and along with three other aircraft to be delivered early next year, will support the execution of IOT&E.

“This contract award is another giant step forward as we continue to execute within the reprogrammed CH-53K program timeline,” said Col. Jack Perrin, program manager for the Naval Air Systems Command Heavy Lift program office. “As the long-range logistic support backbone for the U.S. Marine Corps, it is essential that we get this aircraft to the fleet as quickly and as affordably as possible.”

As the CH-53K moves toward IOT&E in 2021, developmental flight tests are wrapping up. Recently completed testing includes air-to-air refueling while carrying a 27,000 lb. external load, sea trials aboard the USS Wasp, and flight testing in a degraded visual environment in Yuma, Arizona.

Currently there are 24 aircraft on contract with Sikorsky.

Recent articles by defense analysts have highlighted the importance of adding the CH-53K to the operational forces, notably given the strategic shift towards closer US Navy and USMC integration.

As Kris Osborn of *The National Interest* has highlighted with regard to the contract and the impact of the aircraft:

Much heavier lift helicopters bring new tactical dimensions to both expeditionary and maritime warfare as they enable more dispersed operations. Forward-operating otherwise disconnected force concentrations can be resupplied with supplies, weapons and ammunition by heavier helicopter transportation loads, changing the tactical equation.

A combat outpost in an island area in the Pacific can more easily receive reinforcements from amphibiously launched, heavy lift helicopters able to bring much greater supply loads per mission. A CH-53K would also be better positioned to, for instance, sling load mobile artillery weapons or even light tactical vehicles into high-risk land combat areas as well.

Loren Thompson made a similar point in a recent article on defense options for the new Administration:

The Marine CH-53K King Stallion Helicopter. Over the last generation, the U.S. Marine Corps has transformed its aviation branch by introducing the MV-22 Osprey tilt-rotor and the F-35B vertical takeoff fighter. These aircraft deliver unprecedented agility to a ground force that has long styled itself as the military's first responders. Combined with basing at sea, the aircraft enable Marines to respond quickly to crises virtually anywhere.

There is only one item missing from this picture: a cargo helicopter capable of lifting the latest tactical vehicles a hundred miles from amphibious ships offshore into a war zone. The CH-53K King Stallion, begun during the Obama administration, meets this requirement with the most capable cargo helicopter in the world. Not only will it be able to lift more weight than any other rotorcraft in history, but CH-53K will be cheaper to maintain and better protected against hostile fire than the helicopter it replaces.

The value of operating such an aircraft will grow as the Marines position to deter Chinese aggression in the Western Pacific. In addition to growing the size of their amphibious fleet the Marines plan to move forces among islands off the Chinese coast in a way that Beijing can not easily anticipate or counter. That will necessitate lifting anti-ship weapons, tactical vehicles and other materiel on short notice, and some of these items will be too bulky for transport by existing rotorcraft.

With an unrefueled combat radius of 130 miles and superior performance in "high-hot" conditions, the 200 King Stallions the Marine Corps plans to buy from Lockheed Martin's Sikorsky unit will be a game-changer, and not just in the Pacific. Sikorsky expects to begin delivering production aircraft to the Corps during Joe Biden's first year in office, further enhancing the flexibility of the world's premier amphibious force.

An Update on the CH-53K: October 2020

A number of recent articles in the defense press highlighted the CH-53K and the way ahead.

An October 8, 2020 article by Lee Hudson's Aviation Week underscored that the Marines and Sikorsky are nearing a deal for Lot 4 CH-53K production which would be for 6 to 9 aircraft dependent on Congressional decisions.

The article also noted that a training milestone was achieved the month before.

"The first Marine Corps pilots learning to fly the CH-53K completed a two-week Sikorsky-led course on aircraft configuration, controllers and displays. This is followed by government-led training that uses the containerized flight training device that simulates weather and tactical environments and the ability to connect with other simulators for other aircraft training scenarios, CH-53K program director Bill Falk said.

“The first CH-53K maintainers have not started training. But Sikorsky recently received approval to begin using the helicopter emulation maintenance trainer. This trainer is used on a desktop computer and covers maintenance instructions and procedures.”¹

Also, in an October 8, 2020 article, Dan Parsons of Vertical published an article which highlighted USMC reactions to the coming of the CH-53K.

“I would say the 53K is in as good a spot as it’s been in for a long way,” Deputy Commandant for Aviation Lt. Gen. Mark Wise said this week at the Vertical Flight Society’s 76th Annual Forum, held online in 2020 because of the ongoing Covid-19 pandemic.

“Of course, the team at Sikorsky has been doing a wonderful job in making sure how we’ve been developing the test points,” Wise added. “If you look at what it did on the [USS] Wasp and how it’s been advancing through its test points, it’s actually been meeting or exceeding in all cases. It’s hard not to be happy with that. . . . “I’ve been out to see it tested . . . and am very, very happy with what I’m seeing.”

In addition, the article highlighted comments from Maj. Gen. Gregory Masiello, the USMC’s aviation program executive officer.

“The feedback I had from the pilots as far as the stability and flight controls are that this aircraft is unlike any other one that we’ve had,” Masiello said at the VFS Forum. “It’s amazing. It’s digital. I have heard no complaints from the flight control system on the aircraft at all.”

“We also went to the sea trials, the first time this thing went to a boat,” Masiello added. “It went to the Wasp, performed very well,” Masiello said. “This thing can fold up; it’s a marinized helicopter. It’s actually a smaller footprint than its predecessor aircraft and triples the lift.

“If there is one thing that I could change if I could go backwards on this program . . . I probably wouldn’t be calling this a 53, because of the advancements and changes.

“There is obviously some similarities in the look, but aside from that this is a completely different . . . and absolute advancement in aviation for us and essential.”²

And an October 6, 2020 article provided some feedback from the Brits with regard to the aircraft as well.

In that article, the author reported on a presentation by Col. Paul Morris, assistant head of air maneuvers for the British Army.

“In terms of our sister services in the UK, Royal Navy, the medium rotorcraft offers significant flexibility as a multi-role platform capable of enduring operations,” Morris said.

“Our own CH-47 fleet was not designed to go to sea. Although it can be taken on to the new Queen Elizabeth Class carriers down the lift spread and can go into the hangar spread it cannot fold, and we look enviously at the U.S. Marine Corps and the CH-53K Super Stallion and its capabilities in that respect.

“A whole series of future trend analysis and operational experience and trends point to the utility of a medium platform on the future battlefield.”³

In short, the CH-53K is getting ready to enter the fight and initial reactions are that it will add a lot to the fight.

CH-53K: The Advantages of a “Smart Aircraft” and Sustainment

09/18/2020

By Robbin Laird

Next generation air platforms encompass several changes as compared to the predecessors which are at least thirty years old or older, notably in terms of design.

Next generation air platforms are designed from the ground up with the digital age as a key reality.

This means that such systems are focused on being able:

- To provide connectivity with other platforms,
- To have upgradeability built in through software enablement and anticipated code rewriting as operational experience is gained,
- Operating with cockpits built to work with new digital ISR and C2 systems onboard or integrateable within the cockpit of the platform,
- Are built with materials technology, which leverages the composite revolution,
- And have management systems designed to work with big data to provide for more rapid and cost effective upgradeability and maintainability.

Such is the case with the CH-53K compared to its legacy ancestor, the CH-53E or with the venerable but legacy Chinook medium lift helicopter.

Comparing the legacy with the next generation is really about comparing historically designed aircraft to 21st century designed and manufactured aircraft.

As elegant as the automobiles of the 1950s clearly are, from a systems point of view, they pale in comparison to 2020s automobiles in terms of sustainability and effective performance parameters.

What is more difficult to grasp is how the new generation of aircraft also change how sustainability is managed and how the new aircraft provide a ramp launching a new way to manage the aircraft, and to provide for enhanced reliability for those digitally managed aircraft.

Recently, I had a chance to talk with Pierre Garant, now a program director with Sikorsky, but whom I met many years ago when he was the aviation sustainment director at Headquarters Marine Corps. The simple point is that Garant has been at this for a long time. What he brings to the CH-53E and CH-53K is years of credible experience in working 21st century transformation regarding combat logistics.

What Garant argued was that by establishing an effective PBL process in place, which Sikorsky has with both the Seahawk and now with the CH-53E, they can now with the new digital aircraft embed those tools into a PBL framework.

With the PBL framework there is solid working relationship between the government and Sikorsky to better manage the supply chain and to shape more accurate data with regard to parts performance while already setting the foundation for a CH-53K PBL.

They can then take that data and rework how the supply chain can deliver a more effective outcome to reliability and effectiveness in operations.

With the data generated by the CH-53K, the “smart” aircraft becomes a participant in providing inputs to a more effective situational awareness to the real performance of the aircraft in operational conditions.

Then that data then seamlessly flows into the sustainment management system to provide a much more realistic understanding of parts performance.

This then allows the maintenance technicians and managers to provide higher levels of performance and readiness than without the data flowing from the aircraft itself.

Put in other terms, the data which the aircraft generates makes the aircraft itself an “intellectual” participant in the sustainment eco system.

The question then is how best to operate such an ecosystem?

This is a different question than the legacy aircraft and its sustainment system poses.

There the question is determining laws of averages for parts performance from collecting data, and then shaping ways to make sure parts are available at the right time and the right place.

With the aircraft as a participant in the fully-integrated eco system, much more performance is being provided in a much more timely fashion and the question then is how to work the suppliers into the eco system so that they can be informed significantly earlier about what they need to do to contribute more effectively to the fleet.

Another dimension of how the aircraft contributes to its own enhanced reliability is its ability to provide information with regard to fault isolation.

With the digital systems onboard the CH-53K, the aircraft not only generates fault detection, but can precisely isolate where that fault is to be found with accuracy.

This can eliminate false replacements, a problem which the Osprey had for many years in its initial operations.

High reliability of fault detection and fault isolation is a significant game changer for maintenance, and it is the aircraft that will generate the information for this more effective process.

Furthermore, the digital aircraft delivers a tenfold increase of actionable information that fully enables condition-based maintenance as a future reality.

Garant noted the nature of the shift as follows: “The shift is from reactive maintenance to predictive maintenance.”

And the data flows will enable a continuous learning process which can be shaped for the global fleet of the aircraft, rather than being simply being done well at one base and only word of mouth spreading the message on a new way to maintain the aircraft.

As Garant put it: “It’s almost like virtual surgeon, where his knowledge comes to the point of need.”

With all the noise about autonomous systems and AI, what one can overlook is how digital aircraft are now participants in their own maintainability.

Try that with a legacy Chinook or CH-53E.

In short, the CH-53K is a smart aircraft birthed in a digital age that is doing support and manufacturing differently.

In other words, it’s symmetrical with a significant strategic change, rather than being a legacy system struggling to adapt to the new age.

Israeli Defense After the Abraham Accords: Dealing with the Iranian Threat

10/05/2020

By Robbin Laird

The Abraham accords have provided a path around the Palestinian veto of Israeli-Gulf Arab state normalization.

The accords signify a new way ahead.

And that way ahead has been paved by the expanded Iranian threat, and the ability of the Iranian state to operate from a variety of locations in the region: Syria, Iraq, the asymmetric forces operating in crisis spots in the region, and Iran itself.

One aspect is clearly the missile threat from Iran itself.

With the accords, and the continuing modernization of the Gulf Arab air forces, the Israeli Air Force and defense force can work more directly with Gulf Arab Air Forces in shaping a comprehensive air defense and strike force against Iranian based missiles.

This will also require changing C2 and early warning capabilities as well.

Another aspect is the asymmetric threat.

To deal with this, enhanced intelligence sharing will unfold, which will provide Israel with an alternative to their historical working relationship with Turkey.

In addition, the Israelis and the UAE will need to focus as well on ways to move insertion forces directly against asymmetric threats when appropriate and desirable.

This is the domain of Special Forces integrated with air and maritime power.

Specialized airlift and relevant force packages able to operate with the range and speed necessary will become a key necessity.

This may lead to the acquisition of new tiltrotor or assault helicopters as part of an Israeli modernization package as well as reshaping UAE forces as well.

A third aspect is shaping a counterbalance to the Russian reach into the Mediterranean region.

With Turkey and Russia expanding their reach in the Western Mediterranean, the two states now face a new regional redesign in the Eastern Mediterranean.

The unknown factor in all of this of course is the Kingdom of Saudi Arabia and how it will shape its way ahead with the new regional dynamics being unleashed by the Abraham accords.

And as Professor Amatzia Baram has underscored, a ripple effect from the Accords is putting in motion a new route with regard to maritime shipping.

Recently, the UAE-based maritime company Dubai Ports World signed a deal with Israel Shipyards, Ltd. Reportedly, the two companies will submit a joint bid to purchase the Port of Haifa from the Israeli government.

This is how Baram described the impact of such a deal.

“They now are discussing shipping from Dubai, from the Gulf, through the Red sea to Eilat, instead of going through Suez Canal which is quite expensive.

“They will go to Eilat where there will be a train line that goes all the way to Ashdod or to Haifa, or to both.

“And this way the Gulf will have another route to the Mediterranean, not through the Suez Canal. It doesn’t mean that they will not use Suez Canal, they will still use it, but it depends on how large the ship is.

“And so we have another option.

“There is another discussion now between the Emirates and Israel about another line that would go from the Emirates through Saudi Arabia and Jordan to Ashdod and Haifa. This would provide a clear alternative to needing to use the Straits of Hormuz on the way to the Indian ocean.

” Such a strategic rout will reduce the impact of the Iranian threats to close the straits.”

This project will, in turn, shape and define a major security challenge.

How to defend the new sea-land route?

This will require intelligence sharing, integrated security forces, and an ability to move appropriate force to any popup threats the Iranians or other adversaries wish to generate against the new routing as well.

In other words, the Accords put in motion new ways to shape deterrence in depth that can operate across the spectrum of operations to deal in practical ways with Iranian actions.

How will this impact on Israeli defense, and Israeli-UAE joint military and security working relationships?

And how best to deal with the diverse Iranian attack points on the Gulf Arab states and Israel?

The Iranians are innovative in generating new threats as was seen in the drone attack on Saudi Arabia.

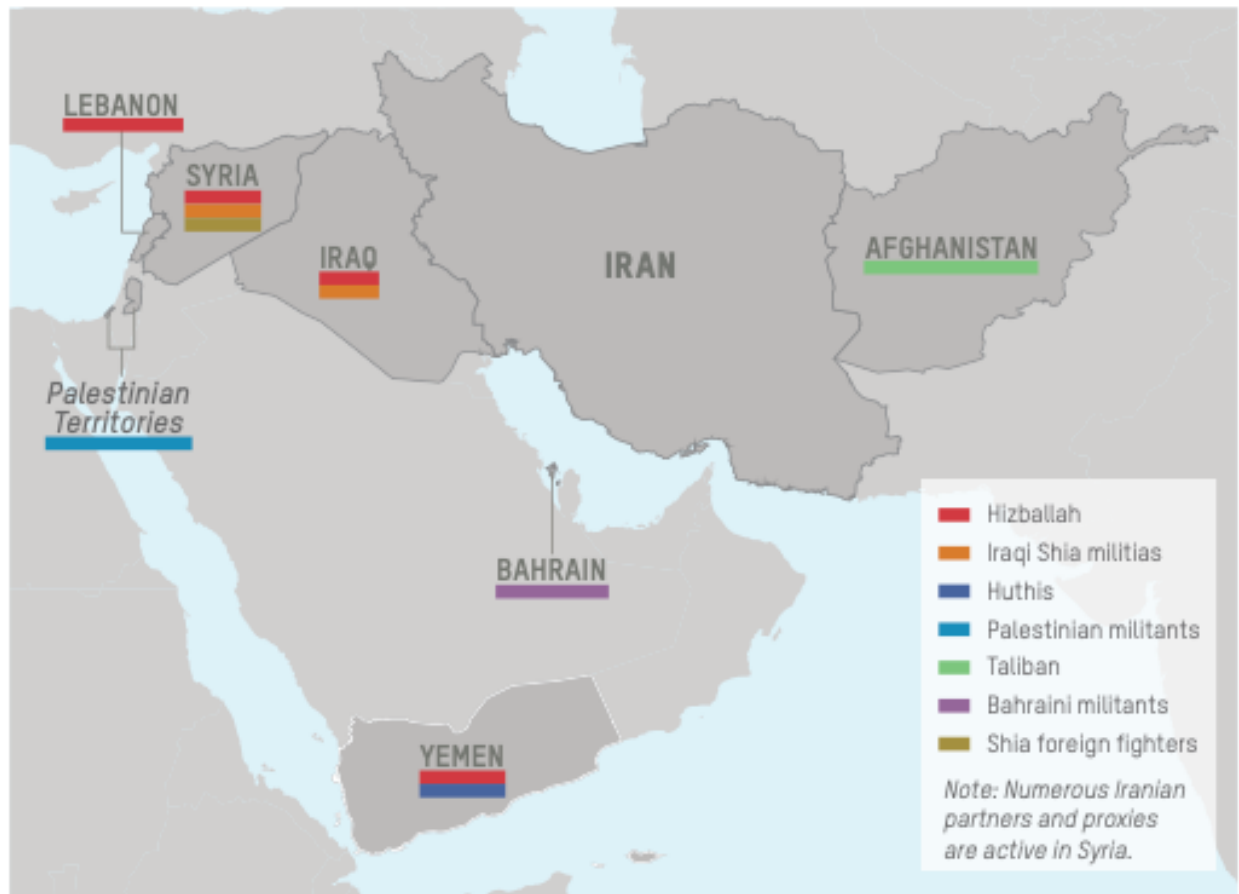
The new working relationships in defense and security between Israel and the Gulf Arab states will clearly need to “out innovate” the Iran threat masters.

How best to do so?

Dynamics of Change for Israeli Defense After the Abraham Accords

10/25/2020

By Robbin Laird



The geopolitical shift enabled by the Abraham accords is a significant one.

How it will play out in practice is an open question.

What is clearly to be expected is that the Iranians will spend the next few months trying to place military and political IEDs into the process of a new geopolitical pact whereby Israel works differently with the GCC states and individual GCC states shape new operational military relations with the state of Israel as well.

The accords have opened the way to reworking the maritime trade routes.

We highlighted that shift in the interview with Amatzia Baram and in the look back to the history of shaping oil pipeline and maritime transits in the region by Ken Maxwell.



Oil from the UAE “and other eastern markets” will be shipped by tanker to the Israeli Red Sea terminal at Eilat. ALAMY

Earlier this week, further agreements are facilitating the change.

According to an article by Richard Spencer, in The Times of London:

“The United Arab Emirates has signed a deal to send oil directly to the Mediterranean through an Israeli pipeline, the biggest result yet from the normalisation of relations between the countries.

“Oil from the UAE “and other eastern markets” will be shipped by tanker to the Israeli Red Sea terminal at Eilat, from where it will be sent along an existing 158-mile pipeline to the Mediterranean port of Ashkelon.

“The deal keeps open the possibility of a future pipeline link from Israel to the Gulf across Saudi Arabia, however, should Riyadh normalise trade relations with it. The pipeline is operated by an Israeli state-owned company, while shipments and storage will be organised through a joint venture between Israeli companies and National Holding, a UAE state business.”

The consequences can be broad of such agreements.

As Spencer went on to note:

“The main loser is likely to be Egypt — an irony, since it was the first Arab state to recognise Israel and remains a key ally of both the United States and the UAE in the region.

“Its own pipeline and the Suez Canal are the main routes for oil to be transferred from the Gulf to the Mediterranean at present. The canal, however, is not large enough to handle the latest supertankers, which can, however, dock in both Eilat and Ashkelon.”

Given Russian energy interests, this alternative path for Middle Eastern oil to the European markets will hardly be welcome, and certainly not by Iran whose leverage for being able to threaten transshipments through the Gulf of Hormuz will be significantly reduced.

Putin has been a judo master of pipeline politics to Europe, but this puts a wrench in the approach which he has been able to shape.

What emerges from this dynamic is a political-economic and security cooperation opportunity which clearly will require close intelligence cooperation among the stakeholders.

The new level of intelligence cooperation will undoubtedly be part of a general reworking to shape the kind of intelligence needed to support broader political-military efforts.

Notably, such efforts are crucial in two key areas.

The first is clearly the question of how to deal with the Iranian missiles and whatever payload they put on them.

What can follow from the accords is shaping a much more integrated offensive-defensive enterprise, one driven in part by an F-35 enabled force.

There is much progress in NATO Europe on addressing engagement with Russian missiles via offensive and defensive capabilities which being integrated to shape combat options.

Clearly, Israel and the GCC states are leveraging this learning and will provide learning of their own as well.

As two analysts put it:

“Another potential security opportunity is a gradual move toward more comprehensive integrated missile defense architectures, integrating early warning assets, information sharing protocols, and missile defense systems – with appropriate firewalls to maintain each nation’s national security.

“Integrated missile defense is among the most complex of military activities, and success in this endeavor would require participation from two US combatant commands (EUCOM and CENTCOM), as well as the accord signatories.”

But there is a third area affected by the accords as well.

As argued above, the Iranians will do what they can to derail any positive process which can be crafted after the accords.

Most likely, this means that they will leverage their various presence points in the region to go after GCC and Israeli interests.

Individual GCC states and the Israelis will need to sort through specific dynamics within and across countries in the region, to find ways to help one another support those common interests which can be forged to deal with Iran.

This means that specific crisis will occur for which Israeli or GCC states will act alone or operate as the supported or supporting political military force against specific and discrete Iranian actions.

This means as well on the Israeli side that force structure will need to develop or be enhanced which would allow for rapid insertion and withdrawal of a combat force either to be the supported or supporting force up against a specific Iranian provocation.

For Israel, this will highlight the need to develop a more capable insertion force involving ground forces at greater distance than has been the regular practice of the IDF.

With the USMC, the package of Ospreys, F-35 and now the CH-53Ks is designed precisely shape such a force.

The Israelis might well consider such an integrated force package which can react, respond, deliver decisive response and leave rapidly.

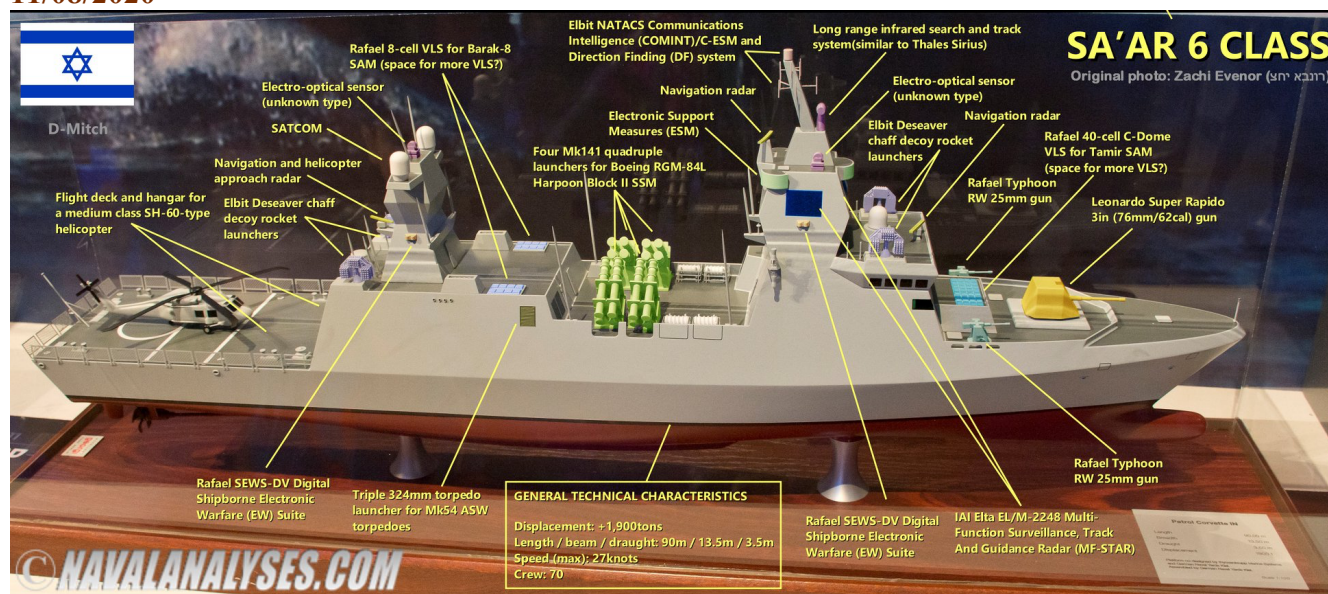
But one thing is clear.

The Abraham Accords are not the end but the beginning of a new phase of geopolitical maneuver to deal with the Iranian challenge.

And this maneuver will have a significant impact on the way ahead for the IDF.

Israeli Defense After the Abraham Accords: Expanding Area of Sea Control

11/08/2020



By Robbin Laird

With the new Abraham accords, the collaborative opportunities for the IDF with GCC partners are clearly expanded.

At the same time, the range of security control necessary to protect the shift in the transit of energy supplies is significant and requires new capabilities and new approaches to operating the IDF to do so.

Next month, the first of four new German-built ships for Israel will arrive for final outfitting prior to become operational.

In 2015, Israel ordered the new corvettes with the intention of expanding its sea control to provide for protection for the expanding natural gas pipelines to support the Israeli economy.

The Abraham Accords are expanding the transit routes crucial now both to the GCC and Israel and will undoubtedly entail joint security and defense operations to provide for protection of the sea areas significant for maritime and energy transit.

In other words, the new ships were ordered before the Abraham Accords, but those agreements reinforces the wisdom of doing so.

They will become part of enhancing IDF capabilities and will contribute to reshaping doctrine to develop maneuver forces in support of Israeli interests in the region.

As Tamar Beerli noted in a [November 4, 2020](#) article in *The Jerusalem Post*:

“As the Exclusive Economic Zone (EEZ) spans over a far larger space than the land of Israel as a whole, the Sa’ar 6 allows the Navy to dominate a larger space and provide a protective shield around Israel’s borders.

“In addition, the ship is capable of staying out at sea for an extended period of time in order to provide a more extensive period of protection in the more vulnerable regions of the EEZ.”

The ships are fitted with Israeli and U.S. combat systems.



According to [Rear Admiral Eyal Harel](#), head of IDF naval operations: “It’s a larger vessel with advanced and hi-tech systems along with long-range missiles, air-to-air, surface, and sea-to-air missiles.

“The radar is bigger and more advanced than what is on the Sa’ar 5.

“With a further range, you can operate the Sa’ar 6 in open seas and in rough sea conditions.”

The ships will operate as flagships for the Israeli Navy and will be key platforms in protecting the EEZ and the gas platforms in the Mediterranean Sea.

The ship is designed to plug and play with other IDF systems, which would allow the ship to fit into an integratable force for air-sea and potential support to land insertion forces as well.

The integratable nature of the Sa’ar 6 was emphasized in a [recent briefing](#) by a senior IDF official.

“The Sa’ar 6 has an enormous radar so it can be a standalone unit.

“Abilities and probability of protection increases, as it is connected to Iron Dome, David’s Sling and other air defense.

“If it detects threats, it can transfer data to land networks to engage targets.”

In other words, the ships will provide a good compliment to the IDF as the IDF considers new capabilities, for targeted insertion force operations.

Such a force could be built in part by adding a new lift platform such as the such as the CH-53K to an extended range insertion force.

Comparing Chinook to the CH-53K: The German Case

09/10/2020

By Robbin Laird

Recently, there have been a number of articles which have directly raised the question of how the Chinook compares with the CH-53K which suggested that the venerable though legacy Chinook is good enough to consider treating the CH-53K as an outlier to both U.S. Army modernization and for the German armed forces.

For example, Loren Thompson wrote a piece published on July 22, 2020 for *Forbes* which is entitled, “Why Boeing Believes it Will Win the competition to Supply Heavy-Lift Helicopters to Germany and Israel.”

This is a good place to start.

Thompson noted that “Boeing, builder of the rival CH-47F twin-rotor Chinook, has other ideas. It thinks it can displace the CH-53 from both the German and Israeli markets by offering an upgraded version of its own heavy lifter that meets all customer performance requirements at considerably less cost.”

We should note at the outset that the CH-53K is a heavy lift helicopter; the Chinook is not—it is a medium lift helicopter, based on weight that each can carry. But putting aside that point, the argument boils down to the notion that the CH-53K is built to support unique Marine Corps missions which the Germans will not need, and that Chinook is more than adequate for German needs.

“Although King Stallion is a bigger aircraft than Chinook, Boeing notes that the size of their cabins is virtually identical. In fact, it says that due to weight limits on the CH-53K’s wheels, the CH-47F can “oftentimes carry more weight internally than the CH-53K.” Since Germany and Israel do not conduct the kind of ship-to-shore maneuvers practiced by the U.S. Marine Corps, Boeing figures that the greater external lifting power of King Stallion isn’t worth the additional cost to either country.”

Then Thompson highlights that Boeing believes that the “CH-53K is so new that its future reliability and maintainability are not yet proven.” And associated with this is that there is a higher level of risk in buying a new helicopter and in the potential challenges of customization of the aircraft for Israeli and

German needs. Boeing ignores that the block upgrade that they offer in their medium lift Chinook is a development and not production program.

But the core point of comparison highlighted by Boeing is the question of cost. “Boeing contends that the cost of procuring and operating the latest version of Chinook is far below that of King Stallion. In an apples-to-apples comparison, it calculates that ‘CH-47F aircraft cost is about half the CH-53K.’ The higher price-tag for King Stallion could be justified if it were a markedly better fit for German and Israeli performance requirements, or more reliable and maintainable, but Boeing doubts that a case for either claim could be made convincingly.”

This presentation highlights why the legacy aircraft has perceived advantages over a new, 4th generation aircraft, but does not really answer the question of how Chinook fits into the new demands being placed on the German armed forces not how it relates to the overall modernization strategy of German defense.

If this was the Cold War, where the primary focus was really upon moving support around Germany to reinforce the direct defense of Germany, then there might be a compelling case for the legacy Chinook.

But that is not what Germany is facing in terms of the return of direct defense in Europe.

In our forthcoming book, *The Return of Direct Defense in Europe: Meeting the 21st Century Authoritarian Challenge*, we focus on the major challenges facing the allies in terms of defense against the Russians in terms of the Poland-to Nordic arc. Within this arc, the challenge is to move force rapidly, to reinforce deterrence and to be able to block Russian movement of force.

Germany faces the challenge of reinforcing their Baltic brigade, moving rapidly to reinforce Poland, and to move force where appropriate to its Southern Flank. In the 2018 Trident Juncture exercise, German forces moved far too slowly to be effective in a real crisis, and it is clear that augmenting rapid insertion of force with lift is a key requirement for Germany to play an effective role.

This is where the CH-53K as a next generation heavy lift helicopter fits very nicely into German defense needs and evolving concepts of operations. The CH-53K operates standard 463L pallets which means it can move quickly equipment and supply pallets from the German A400Ms or C-130Js to the CH-53K or vice versa.

This is not just a nice to have capability but has a significant impact in terms of time to combat support capability; and it is widely understood that time to the operational area against the kind of threat facing Germany and its allies is a crucial requirement.

With an integrated fleet of C-130Js, A400Ms and CH-53Ks, the task force would have the ability to deploy 100s of miles while aerial refueling the CH-53K from the C-130J.

Upon landing at an austere airfield, cargo on a 463L pallet from a A400M or C-130J can transload directly into a CH-53K on the same pallet providing for a quick turnaround and allowing the CH-53K to deliver the combat resupply, humanitarian assistance supplies or disaster relief material to smaller land zones dispersed across the operating area.

Similarly, after aerial refueling from a C-130J, the CH-53K using its single, dual and triple external cargo hook capability could transfer three independent external loads to three separate supported units

in three separate landing zones in one single sortie without having to return to the airfield or logistical hub.

The external system can be rapidly reconfigured between dual point, single point loads, and triple hook configurations, to internal cargo carrying configuration, or troop lift configuration in order to best support the ground scheme of maneuver.

If the German Baltic brigade needs enhanced capability, it is not a time you want to discover that your lift fleet really cannot count on your heavy lift helicopter showing up as part of an integrated combat team, fully capable of range, speed, payload and integration with the digital force being built out by the German military.

It should be noted that the CH-53K is air refuelable; the Chinook is not.

And the CH-53 K's air refuelable capability is built in for either day or night scenarios.

A 2019 exercise highlighted the challenge if using the Chinooks to move capability into the corridor.

In the Green Dagger exercise held in Germany, the goal was to move a German brigade over a long distance to support an allied engagement. The Dutch Chinooks were used by the German Army to do the job.

But it took them six waves of support to get the job done.

Obviously, this is simply too long to get the job done when dealing with an adversary who intends to use time to his advantage. In contrast, if the CH-53K was operating within the German Army, we are talking one or two insertion waves.

And the distributed approach which is inherent in dealing with peer competitors will require distributed basing and an ability to shape airfields in austere locations to provide for distributed strike and reduce the vulnerabilities of operating from a small number of known airbases.

Here the CH-53K becomes combat air's best friend. In setting up Forward Operating Bases (FOBs), the CH-53K can distribute fuel and ordnance and forward fueling and rearming points for the fighter aircraft operating from the FOBs.

Being a new generation helicopter it fits into the future, not the past of what the Bundeswehr has done in the Cold War. It is not a legacy Cold War relic, but a down payment on the transformation of the Bundeswehr itself into a more reactive, and rapid deployment force to the areas of interest which Germany needs to be engaged to protect its interests and contribute to the operational needs of their European allies.

From an operational standpoint, the K versus the E or the Chinook for that matter, offers new capabilities for the combat force. And from this perspective, the perspective of the two platforms can be looked at somewhat differently than from the perspective presented in the Thompson article.

Next generation air platforms encompass several changes as compared to the predecessors which are at least thirty years old or older, notably in terms of design. Next generation air platforms are designed from the ground up with the digital age as a key reality.

This means that such systems are focused on connectivity with other platforms, upgradeability built in through software enablement and anticipated code rewriting as operational experience is gained, cockpits built to work with new digital ISR and C2 systems onboard or integrateable within the cockpit of the platform, materials technology which leverages the composite revolution, and management systems designed to work with big data to provide for more rapid and cost effective upgradeability and maintainability.

Such is the case with the CH-53K compared to its legacy ancestor, the CH-53E or with the venerable legacy Chinook medium lift helicopter. Comparing the legacy with the next generation is really about comparing historically designed aircraft to 21st century designed and manufactured aircraft. As elegant as the automobiles of the 1950s clearly are, from a systems point of view, they pale in comparison to 2020s automobiles in terms of sustainability and effective performance parameters.

To take two considerations into account, the question of customization of the German and Israeli variants and the question of sustainability both need to be considered with next generation in mind.

With regard to customization and modernization, digital aircraft provide a totally different growth path than do a legacy aircraft like the CH-53E or the CH-47. Software modifications, and reconfigurations can provide for distinctive variants of aircrafts in a way that legacy systems would have to do with hardware mods. And with regard to security levels of information flows, software defined systems have significant advantages over legacy systems as well.

With regard to sustainability, NAVAIR and the USMC have taken unprecedented steps to deliver a sustainable aircraft at the outset. The logistics demo effort at New River has taken the new aircraft and worked through how to best ensure sustainability when the first squadron is deployed.

With the data generated by the CH-53K, the “smart” aircraft becomes a participant in providing inputs to a more effective situational awareness to the real performance of the aircraft in operational conditions, and that data then flows into the management system to provide a much more realistic understanding of parts performance. This then allows the maintenance technicians and managers to provide higher levels of performance and readiness than without the data flowing from the aircraft itself.

Put in other terms, the data which the aircraft generates makes the aircraft itself an “intellectual” participant in the sustainment eco system. This is certainly not the case with legacy aircraft which were not birthed in the digital software upgradeable world.

The next generation system which the CH-53K represents brings capabilities to the challenges which Germany faces in terms of getting force rapidly to the point of attack or defense required by the Bundeswehr. It is no longer about defending against breakthroughs in the Fulda Gap; it is about moving force rapidly to make a difference in a time urgent combat setting on Germany’s periphery and flanks.

As I wrote earlier:

For Germany, the K clearly would be part of how they might adjust flexibility to the strategic shift facing the liberal democracies in dealing with the Russians.

For example, Germany needs to rapidly reinforce their Baltic brigade or move forces forward to reinforce Poland in a crisis.

Compared to Chinook, the K goes further, faster and brings a significantly greater combat load to the fight rapidly.

And flying with the A400 M or the C-130J, the ability to carry standard pallets means a rapid movement of cargo from an airlifter to the K to move support within an area of interest.

And the K is changing as well the meaning of what a support helo really is.

It is in an information or C2 asset through the nature of the cockpit and how information can be managed within the cockpit or delivered to the combat soldiers onboard the aircraft.

This means that for Germany, the K is already FCAS enabled, or able to operate in a combat cloud in a way certainly neither the E nor the Chinook can do.

The FCAS enabled part is also crucial for Germany.

The FCAS approach is forward leaning and ultimately rests on shaping the networks which enable an integratable force. It is not about simply building a replacement combat aircraft; it is about building out a system of networks which can able an integratable force to work effectively together. Simply buying legacy systems and leaving networked capabilities to show up in a future FCAS really misses the point; integratability has to be built in which it clearly is with the CH-53K.

It is a down payment on building out the kind of networked force Germany has committed itself too with its FCAS commitment. Put in other terms, platform choices should be considered as well from the vantage point of whether or not that platform choice advances the integratable force able to move rapidly to the point of attack or defense or not.

From this standpoint the choice is clear: The Chinook represents the Cold War past; the CH-53K the future of the integratable force.

With the shaping of a new force structure within the context of the current and projected security context for Germany, it makes sense that each new platform or program be made with regard to where Germany is headed in terms of its 21st century strategic situation, and not be limited by the thinking of the inner-German defense period.

Four New Weapons That Will Define the Biden Defense Posture

By Loren Thompson

Predicting the defense priorities of a new administration, especially one that hasn't yet taken office, is a risky business. Although Joe Biden has a long and fairly consistent track record on national security, the fallout from a global pandemic and disrupted economy may drive changes in military plans that few observers are expecting.

New weapons often bear the brunt of such shifts, because it is easier to delay programs that haven't made their way into the force. Warfighters are less likely to miss capabilities they don't already have, and political constituencies are less likely to be upset by the loss of jobs that don't already exist. However, this commentary is about four new weapons programs that aren't going away, and will likely come to define the Biden defense posture. None of the programs listed below has entered the joint force, and yet each is so central to the way Joe Biden and Democrats in general think about defense that they are sure to survive....

The Marine CH-53K King Stallion Helicopter. Over the last generation, the U.S. Marine Corps has transformed its aviation branch by introducing the MV-22 Osprey tilt-rotor and the F-35B vertical takeoff fighter. These aircraft deliver unprecedented agility to a ground force that has long styled itself as the military's first responders. Combined with basing at sea, the aircraft enable Marines to respond quickly to crises virtually anywhere.

There is only one item missing from this picture: a cargo helicopter capable of lifting the latest tactical vehicles a hundred miles from amphibious ships offshore into a war zone. The CH-53K King Stallion, begun during the Obama administration, meets this requirement with the most capable cargo helicopter in the world. Not only will it be able to lift more weight than any other rotorcraft in history, but CH-53K will be cheaper to maintain and better protected against hostile fire than the helicopter it replaces.

The value of operating such an aircraft will grow as the Marines position to deter Chinese aggression in the Western Pacific. In addition to growing the size of their amphibious fleet the Marines plan to move forces among islands off the Chinese coast in a way that Beijing can not easily anticipate or counter. That will necessitate lifting anti-ship weapons, tactical vehicles and other materiel on short notice, and some of these items will be too bulky for transport by existing rotorcraft.

With an unrefueled combat radius of 130 miles and superior performance in "high-hot" conditions, the 200 King Stallions the Marine Corps plans to buy from Lockheed Martin's Sikorsky unit will be a game-changer, and not just in the Pacific. Sikorsky expects to begin delivering production aircraft to the Corps during Joe Biden's first year in office, further enhancing the flexibility of the world's premier amphibious force.

For the full article, see the following:

<https://www.forbes.com/sites/lorenthompson/2020/11/13/four-new-weapons-that-will-define-the-biden-defense-posture/>

Footnotes

1. Lee Hudson, "Marines, Sikorsky Near CH-53K Lot 4 Deal," *Aviation Week* (October 8, 2020).
2. Dan Parsons, "U.S. Marines 'very, very happy' with CH-53K progress," *Vertical* (October 8, 2020).

3. Kelsey Reichmann, “NATO Looks to the Future of Medium Rotorcraft Development,” *Aviation Today* (October 6, 2020)