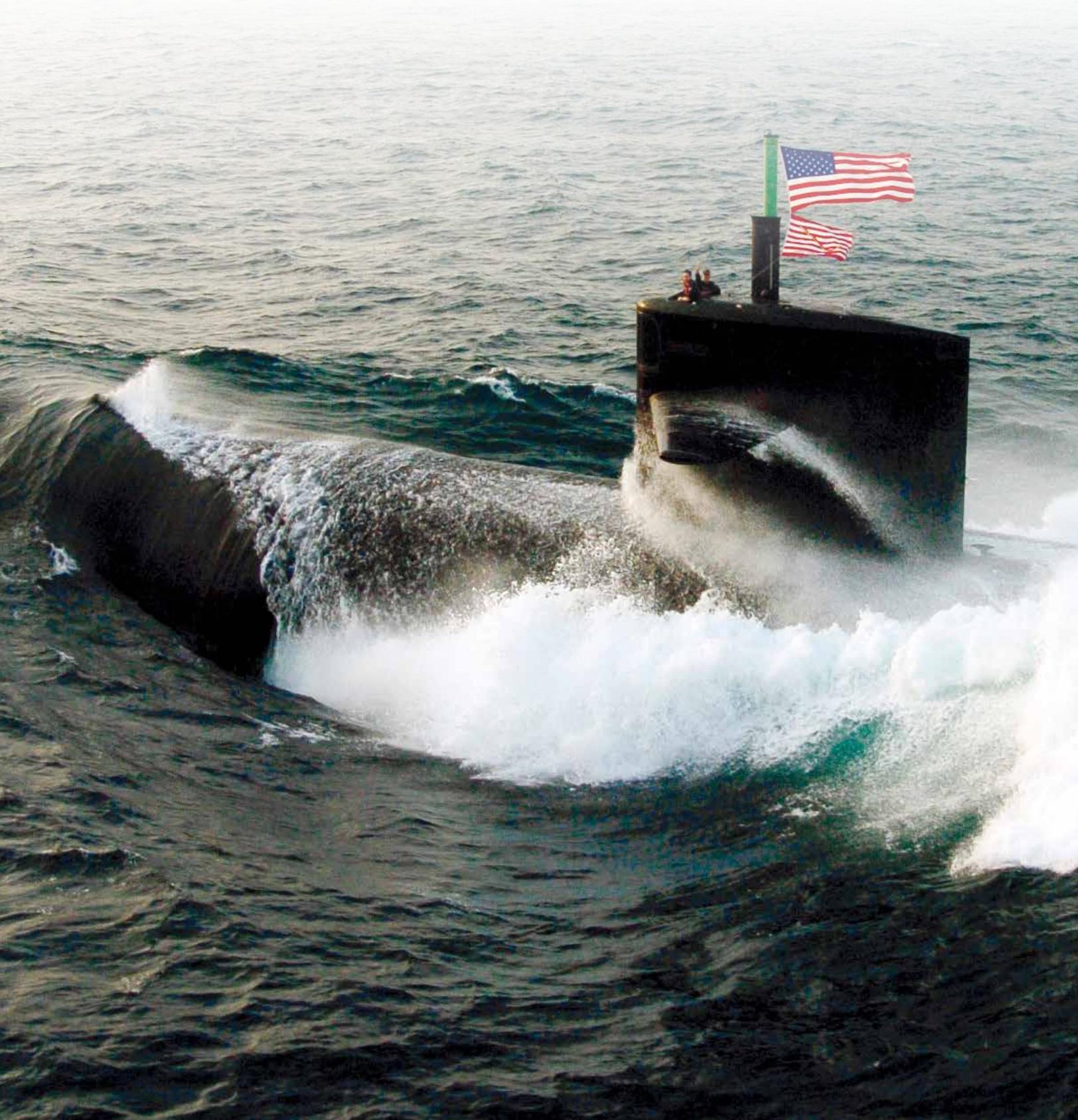


Honeywell

THE POWER OF **CONNECTED**

HONEYWELL MOTION CONTROL

Marine Systems



Marine Systems

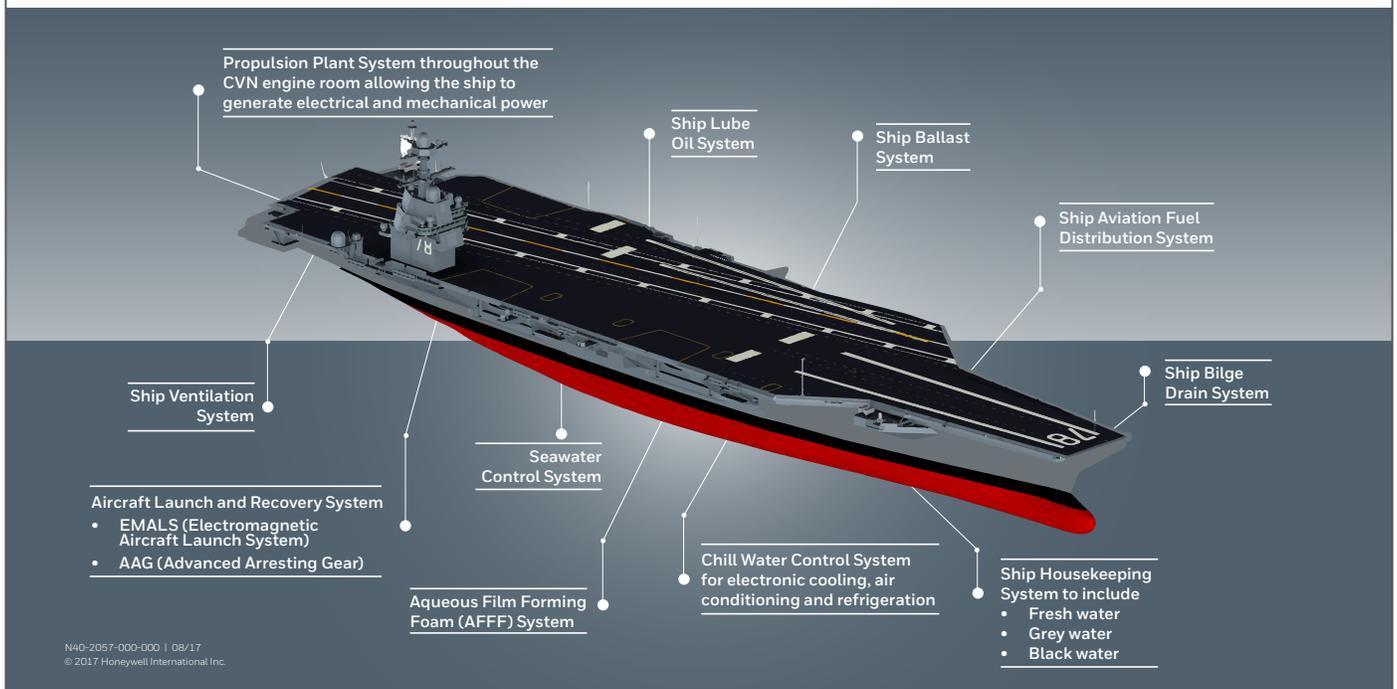
Honeywell provides a number of products to the US Navy and its shipbuilders. Functions range from control valves and valve actuation, to weapons handling, to vibration control.

As needs migrate toward more high-power electric actuation to reduce costs and maintenance, Honeywell is committed to providing state-of-the-art marine Electromechanical Actuation solutions to meet customers' needs in these harsh environments, providing marine vessels with a lower-cost alternative to leaky, expensive-to-maintain hydraulic Actuation Systems.

Honeywell has experience in fluid and electromechanical quiet-technology equipment designed to meet stringent acoustic requirements while maintaining operation in harsh environments, minimizing impact to mating equipment and being serviceable.

USS Gerald Ford Aircraft Carrier

The Honeywell electromechanical actuator is integrated into several critical systems onboard providing the following operational capabilities:



Over 1000 electromechanical actuators per ship

Marine Product Line Timeline

- 1950's** – Developed first 3000 psi hydraulic system for submarine control valves.
New Bendix hydraulic valves on Tang Class submarine reduced the size and noise of hydraulic components and became the new standard for use on submarine controls systems.
- 1960's** – Designed and developed hydraulic servo valves for submarine applications.
- 1970's** – Quiet-valve technology developed and installed on Los Angeles and Ohio Class submarines.
- 1980's** – Designed and developed the CAFV (control air firing valve).
Developed munitions handling technologies for surface combat ships.
- 1990's** – New and improved quiet technology installed on Seawolf and Virginia Class submarines.
Quiet valves, quiet hydraulic motors and Actuators.
- 1990-2000's** – Honeywell develops quiet EMA technology for Virginia Class submarine cradlelock.
- 2010's** – Honeywell EMA Actuators installed on CVN78 Class carriers. Developed the Aqueous Film Forming Foam (AFFF).

Honeywell Products and Capabilities

Functionality	Product Type	Description	Features and Benefits
<p>Valves and Actuation</p> <ul style="list-style-type: none"> • Ballast Control • Fuel and oil systems flow control • Fresh and waste water flow controls • Hydraulics flow controls • Compressed and ambient air flow controls <p>Propulsion system valve control</p> <ul style="list-style-type: none"> • Water and steam flow • Ventilation control • Lube oil systems <p>Aircraft launch/recovery (EMA Launch System / Aircraft Arresting Gear)</p> <ul style="list-style-type: none"> • Cooling system 	<p>Permanent Magnet ElectroMechanical Actuator (PMEMA)</p> 	<p>Honeywell Actuators provide long-life operation for gate valves, globe valves, ball valves, butterfly valves, plug valves and critical ship systems</p>	<ul style="list-style-type: none"> • Reduced Maintenance • Long life designs • Fault notification • Easy installation and set up • Common Direct Control Interface <ul style="list-style-type: none"> – Programmable speed and torque ranges – Selectable fiber optic and standard connection protocols – Network and local operation – Local status indication thru LEDs and LCD • Redundant electronic and manual override system • High Power: up to 440 VDC 3 phase motors
Shock and Vibration Isolation	<p>POSyDen</p> 	<p>Our products use springs and viscous fluid damping to reduce vibrations and their effects on the structure, allowing systems to remain stiff while carrying large dynamic loads</p>	<ul style="list-style-type: none"> • Scalable, platform agnostic, and application specific: Developed in all shapes and sizes to suit requirements • Performance is unaffected by internal wear or environment factors • Higher performance over (40%+) traditional isolation/damping • Reduced maintenance and structural fatigue
Munitions handling controls	<p>Cradlelock</p> 	<p>Multiplex controller and EMA used for torpedo indexing in submarines</p>	<ul style="list-style-type: none"> • EPCC Controls 24 different Actuators, four at one time • Used to stow weapons trays
	<p>Phalanx</p> 	<p>Pneumatic Gun Drive Close-In-Weapon-System</p>	<ul style="list-style-type: none"> • System rotates the Gatling Gun barrel assembly and ammo feed • Ammo feed and barrel drive assembly are mechanically tied. • Pneumatically powered by a stored gas subsystem
Firefighting and fire suppression systems	<p>Aqueous Film Forming Foam (AFFF)</p> 	<p>Creates the mixture of concentrate and seawater to produce foam for fighting shipboard fires. The rugged controller monitors and controls system operation with multiple display features</p>	<ul style="list-style-type: none"> • Operates with flow demand (Seawater and AFFF) from 90 to 1300 gpm and maintains 3.0% +0.9%/-0.0% AFFF to Seawater Concentration • Operates on 115 Vac • Non-Obtrusive, Non-Leaking, No Pressure Drop • Contamination Tolerant • Insensitive to variations in Viscosity Temperature, and Pressure • Flow Transmitters installed in Controller

Honeywell's Actuation Systems can also include built-in, remote operation, and status monitoring of each device. The data from these devices provides Prognostic Health Monitoring (PHM) capabilities, facilitating predictive and proactive maintenance. With a constellation of connected devices on a platform, Honeywell's Actuators perform the work and the maintenance, enabling smaller crews to monitor and operate the devices remotely, allowing the warfighter to focus on the mission, not on reactive repairs.

Honeywell Heritage

Over a 50-year period, Honeywell has designed and manufactured over 250 EMA part numbers for defense Marine, Missile, Space and Commercial markets, each time providing precision control in the harshest environments for numerous applications and platforms. Our current Electromechanical solutions on Surface and Submarine vessels draw on the experience of decades of electromechanical applications.

Small Systems and Large Systems



Analog
Controllers



Single Channel
Digital Controllers



Dual Channel
Digital Controllers



150 lb Force
0.2 in/sec
Linear



200 lb Force
0.2 in/sec
Linear



230 lb Force
3.5 in/sec
Linear



278 lb Force
2.5 in/sec
Linear



330 in- lb
60 deg/sec
Rotary



1200 lbf
Linear



2700 lbf
9.0 in/s
Linear



7000 in-lb
Dual Channel
Rotary



6500 lbf
12.9 in/s
Linear



>25,000 lbf
Dual Channel
BLDC Actuators

Global Network of Support Services:

Honeywell's comprehensive support network, spanning the Americas, Europe, Middle East, Africa, Asia, and the South Pacific, delivers fully-integrated service solutions and 24/7/365 support to meet the needs of the aerospace industry. As a world leader of aviation aftermarket services, Honeywell provides the knowledge and resources to take care of all your service needs – whenever and wherever you require maintenance and repair services. Our comprehensive global services provide industry recognized service support including repair, overhaul, and asset logistics with unmatched turn-time and quality performance supported by the Honeywell Operating System (HOS). Honeywell supports military customers internationally across Europe, the Middle East, Africa, India, Asia Pacific and the Americas, so wherever you are, we are. Our international organization has its headquarters in Switzerland and we have facilities in countries including Afghanistan, Australia, Belgium, Brazil, Colombia, Czech Republic, France, Germany, India, Ireland, Italy, Japan, Kuwait, Mexico, Qatar, Saudi Arabia, Singapore, South Korea, Switzerland, United Kingdom, and the United Arab Emirates. Honeywell offers local resources, domestic technology centers, manufacturing operations and local distributors and multi-lingual, 24/7 customer support centers to provide for all our customers.

Honeywell Aerospace

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