DEFENCE & SECURITY

PROTECTING LIVES, PROTECTING SOVEREIGNTY

GRIFFONHOVERWORK

WHY MILITARY HOVERCRAFT?

1. Offensive operations in uncharted amphibious environments
2. Humanitarian & logistical transport to isolated populations
3. Defence and security operations in shallow water environments

From the dense habitats of South America to the frozen seas of the Arctic, in every corner of the globe there is a need to access areas conventional vehicles cannot reach. Hovercraft overcome these impassable transitional environments by hovering above surfaces of mud, sand, water, snow and ice.

Debris, vegetation, fast flowing water or shallows can take up valuable operational time and hinder strategic manoeuvrability. In more troubled environments natural disasters can destroy all infrastructure whilst hostile insurgents, Improvised Explosive Devices and mines cost the lives of personnel and civilians. Hovercraft offer strategic and operational mobility saving lives, time, and capability by flying up to 1.8m over the debris and obstacles that restrict movement of troops and logistics in littoral war and disaster zones.

Hovercraft move past shallows and debris quickly and securely to deliver the most specialised organisations in the world directly to where they are needed, when they are needed.

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WHO ARE WE?

Our customers are trusted by millions to protect the lives and sovereignty of their country. We provide our users with the ability to deliver this duty with certainty over the most inaccessible locations and coastlines of the world.

History

Griffon Hoverwork has been at the forefront of hovercraft development and innovation ever since they were first conceived in the 1950's, through to the modern craft we manufacture today. Throughout our history, we have supplied over 180 craft to over 40 countries around the world for military, commercial, and lifesaving roles. These include some of the most elite forces across the globe, operating within the most hostile amphibious environments. Our users have succeeded in active warzones, such as the Royal Marines in Iraq, to combating insurgency such as the Colombian and Peruvian Navy in the South American jungle, to conducting security and border operations such as the Indian Coastguard.

Quality

When conducting operations, having trust in the equipment you use is paramount to allow for success. Our craft are built to the latest IMO endorsed codes of practice and our craft are certified by International Association of Classification Societies members. To ensure the greatest possible user wellbeing we hold current ISO 9001 quality and ISO 18001 safety certification.

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CHANGING ENVIRONMENTS

Our planet's climate is changing at record pace. Rising sea levels are changing coastlines across the globe and exposing increasing numbers of communities to marine environments whilst the increasing frequency of natural disasters that endanger lives. NASA have estimated that within the next 80 years worldwide sea levels have the potential to rise up to an additional 122cm, compared to the 20cm rise between 1880 and today.

These environmental changes are continuing to increase geopolitical tensions across the planet with new sea routes opening, destinations developing and environments degenerating.

Increased extreme weather events, such as flooding, damage and destroy the infrastructure that communities rely on. Roads and paths become submerged turning entire areas into uncharted territory. To save lives within a humanitarian role fast, effective response is required. Due to the debris and obstacles in the fast-flowing water a boat's hull and propulsion systems become vulnerable to damage. With no landing zones helicopters can struggle to land whilst not transporting the necessary volumes of resources to where it is needed.

A vehicle requirement that can land on beaches and shorelines, over fast flowing water overcomes these conventional problems. By flying up to 2 metres above the surface hovercraft avoid the obstacles and stopping boats whilst delivering large payloads exactly to where it is needed, fast. Enabling quick and direct response, effective relief and rapid response becomes possible.

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HOW MILITARY CRAFT WORK

Key Features:

1. Fly over obstacles, including mines direct to objective
2. Ballistic protected compartments for survivability
3. Hover is maintained when shot
4. Craft outfitted with weapons and defence systems

Hovercraft use lift fans to push air down underneath their hulls to inflate the skirt system below. The inflation of the skirt lifts the hovercraft's hull into the air separating it from the surface. This "hover height" can vary between 30cm to 2m depending on the size of the Griffon craft. This enables the hovercraft to fly over the environment and obstacles below with minimal friction and ground pressure for direct amphibious movement or mine and wall clearance.

Hovercraft use ducted fans located externally to propel the craft forward over multiple surfaces. This means the hovercraft's propulsion is not dependant on the water or ground traction like conventional vehicles.

A hovercraft skirt is inflated which can be ripped and pierced by ballistics fire but continue to maintain the hover height. When taken off hover the craft will float in the water like a boat allowing for work to be carried out on a stable, static platform.

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OFFENSIVE OPERATIONS

Hovercraft offer effective, fast and direct movement of capabilities across transitional, unknown environments under enemy control. Often, these uncharted areas can become flooded to hinder this movement with countermeasures such as mines or IEDs laid in wait.

Hovercraft offer fast and direct movement over these challenges to exactly where is required to give troops on the ground the greatest chance of success.

In 2003 539 Assault Squadron of the UK Royal Marines used their 2000TD fleet to fly into the enemy controlled waters of Southern Iraq to clear the Al Faw peninsula of enemy presence and mines, securing a route for armoured forces to advance towards Basra. In a number of days the majority of the southern coast was under British control, opening the opportunity to secure supply lines further inland. The Royal Marines have since upgraded to now use a fleet of 2400TDs.

In the South Western region Putumayo in Columbia the epicentre of the nation's war on drugs is found. The environment is defined by its winding fast flowing rivers, dense jungle, debris and drastically varying seasonal water depth. In 2013, responding to the challenges posed the first of 8 Griffon 2000TD hovercraft were delivered. They are used to maintain control of otherwise inaccessible areas to take the fight to insurgents and illegal narcotics groups. The Peruvian Navy also operate 8 x 2000TDs in this role.

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LOGISTICS & AID

As well as the forward elements, the logistics and supply chain of operations also must be capable of travelling over amphibious terrain. Humanitarian disasters caused by extreme weather such as tsunamis and hurricanes can also devastate civilian populations in peacetime, destroying infrastructure isolating the vulnerable.

In these situations, large payload hovercraft can be utilised to deliver vehicles, personnel and supplies in high volume quickly over damaged environments that boats cannot lift and helicopters cannot land in. The Swedish Amphibious Battalion operate a fleet of 3 x 8100TD each with a payload of 10 tonnes. Configured with a bow ramp for vehicle embarkation these hovercraft enable the Amphibious Battalion to reach all locations across Sweden's often frozen landscape with a capable, effective presence.

In 2010, Pakistan was subjected to severe flooding effecting 20 million people. Water overran flood defences ripping up roads and transport networks, leaving pockets of individuals scattered across the uncharted, debris filled flood zone. Using their fleet of 2000TDs the Pakistan Navy was able to travel over these fast flowing waters without fearing about the hidden dangers under the surface. life saving water, food, medicine and shelter was delivered whilst the vulnerable could be safely rescued. Following this operation, in 2014 the Pakistan Navy ordered a fleet of their own larger 8100TD hovercraft.

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SECURITY

Challenging native terrain with low levels of infrastructure can dangerously reduce the ability to ensure effective border defence & security. To enable effective security and protection there can often be requirements to patrol, detect and respond to threats who look to take advantage of challenging terrain. Hovercraft allow for users to operate in low infrastructure environments to ensure the protection of lives and nullify illegal operations even in the most remote areas of environmental transition.

Having previously operated a fleet of small Griffon Hovercraft the Kuwait Coast Guard upgraded their fleet to include an 8100TD in 2008. The coast guard use these craft to patrol the northern riverine areas and shallow waters around the flat uninhabited Bubiyan island and associated chains bordering Iraq. The hovercraft are used for customs and policing duties, as well as for search and rescue, maritime pollution limitation and logistics support.

With the largest Griffon hovercraft fleet anywhere in the world, the Indian Coastguard operate 16 x 8000TDs along the shallow littoral landscape and 7,500km coast. These craft have been involved in SAR, border patrol and counter narcotics operations. They also enhance surveillance and response in isolated areas with the capability to patrol the shoreline for three to four days at a time, landing on the beach to conduct surveillance with night vision equipment.

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LIGHT LIFT HOVERCRAFT

380TD

With a smaller payload than the rest of the range the 380TD enables its users to manoeuvre exactly where they are needed within tight, compact environments, still capable of reaching high speeds over variable surfaces with 380kg of payload.

Used for fast mobile response, the 380TD is capable of deployment via road trailer.

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SPECIFICATION

Payload	380kgs
Personnel Capacity	3-4
Speed	28 knots
Endurance	4 Hours
Obstacle Clearance	0.36 m
Range (Standard)	150 NM

995ED

This electric diesel craft provides precise manoeuvrability and a stable platform for operations with just under 1 tonne of payload for quick, direct, effective response.

The 995ED provides the functionality of a larger amphibious vehicle in a smaller, more manoeuvrable and easily maintainable package that can be deployed via road trailer.

SPECIFICATION

Payload	995kgs
Personnel Capacity	8
Speed	30 knots
Endurance	4 Hours
Obstacle Clearance	0.5 m
Range (Standard)	150 NM

MEDIUM LIFT HOVERCRAFT

2000TD

The most versatile and experienced craft, proven in the most extreme conditions from humanitarian disasters to warzones, fulfilling the requirement of protecting and saving lives across the globe, no matter where they are.

From the Arctic Circle to the jungles of South America and sandbanks of the Middle East the 2000TD has operated in every environmental extreme.

SPECIFICATION

Payload	2,000kgs
Personnel Capacity	12-14
Speed	34 knots
Endurance	7 Hours
Obstacle Clearance	0.6 m
Range (Standard)	350 NM

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2400TD

Built to fulfil the tasks requiring specialised equipment and machinery at hand without sacrificing it's operational capability. The 2400TD brings power over challenging environments in a size fit for fast, mobile response.

Originating from the 2000TD, the 2400TD was created to provide a platform that could more effectively complete more demanding tasks in extreme environments.

SPECIFICATION

Payload	2,400kgs
Personnel Capacity	15-18
Speed	35 knots
Endurance	7 Hours
Obstacle Clearance	0.7 m
Range (Standard)	245 NM

MEDIUM LIFT HOVERCRAFT

8000TD

Continuous development over more than 10 years has resulted in the most proven, versatile, twin-engine hovercraft, capable of carrying double the payload of the next largest hovercraft at loads of up to 8,000kg..

Its unique design permits many possible layout options with similar standard hull and machinery installations.

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SPECIFICATION

Payload	8,000 kgs
Personnel Capacity	42-56
Speed	40 knots
Endurance	10 Hours
Obstacle Clearance	1.25 m
Range (Standard)	225 NM

8100TD

The 8100TD is the larger, 10 tonne carrying "big brother" to the most popular twin engine model in the Griffon Hoverwork range; the 8000TD.

An amphibious, all terrain logistical work horse. A platform for the protection of lives and sovereignty. The 8100TD ensures tactical asset delivery and deployment for the future proofing of defensive capability in evolving environments.

SPECIFICATION

Payload	10,000 kgs
Personnel Capacity	56-75
Speed	40 knots
Endurance	10 Hours
Obstacle Clearance	1.25 m
Range (Standard)	225 NM

HEAVY LIFT HOVERCRAFT

BHT

A high payload hovercraft for effective delivery for large volumes of logistics, passengers and vehicles over long distances on a specialised platform. The BHT connects more of what's needed to beyond furthest reaches human development.

The largest hovercraft currently in operation from Griffon's range with 18-21 tonnes of payload over three separate models.

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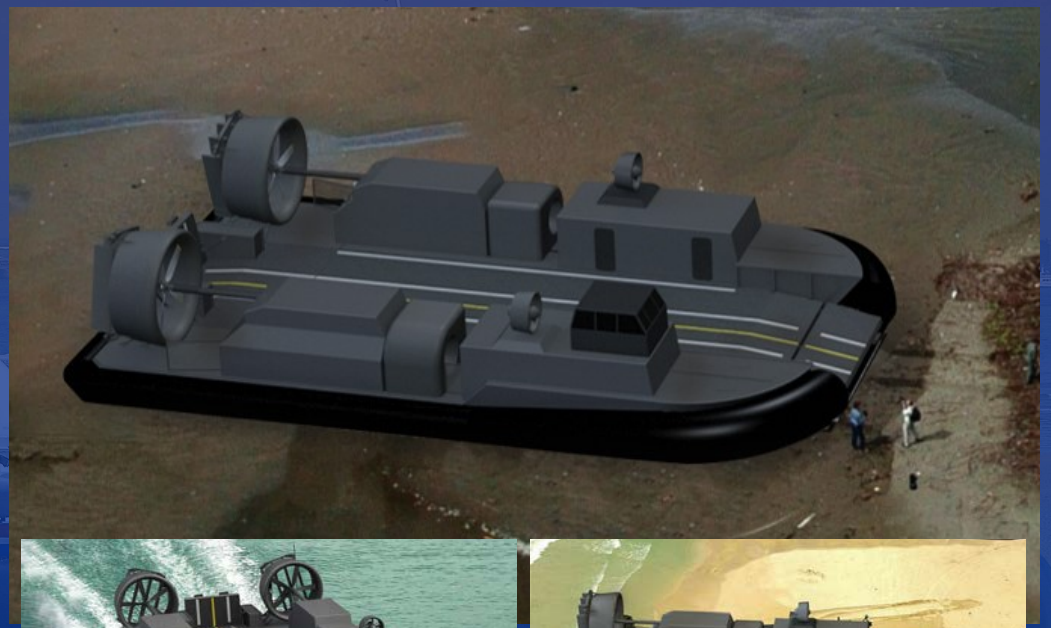
SPECIFICATION

Payload	18-21 Tonne
Passenger Capacity	130 -180
Speed	45 knots
Endurance	6 hours
Obstacle Clearance	1.8 m
Range (Standard)	270 NM

FCAC (Craft in Development)



The FCAC was designed to meet the need seen across the world for an effective vehicle that can deliver large amounts of resources to exactly where they are needed.

Reaching speeds of 40 knots, the FCAC can be outfitted to carry 35,000kgs to 70,000kgs of material, vehicles or tanks with allocated space to transport up to 70 people including integrated cabins.

SPECIFICATION

Payload	35-70 Tonne
Personnel Capacity	70+
Speed	50 knots
Endurance	5 Hours
Obstacle Clearance	1.8 m
Range (Standard)	250 NM

INNOVATING FOR THE FUTURE

The world continues to develop both environmentally and technologically. Griffon Hoverwork strives to ensure we remain at the forefront of maritime innovation. This is accomplished through dedicated study of craft, co-operation with users, and additional marine engineering.

Craft of the Future

Our craft design process begins and ends with customer requirements and is driven by these processes. These designs are driven by the requirements for higher payloads, reliability, and future proof technology

Proven Innovation

Recent developments in craft design by Griffon have occurred in arenas from aluminium bonding hull design to electric diesel propulsion. Our innovations do not remain conceptual, instead they are implemented and proven with craft used in the commercial sector ready for military application.

Bespoke Development

Using our knowledge of both aeronautics and maritime operation we supply bespoke vehicle development, changing operational challenges into operational capability. Previously, Griffon supplied the UK MOD with the PACSCAT landing craft for Over The Horizon assault capable of carrying a Main Battle Tank.

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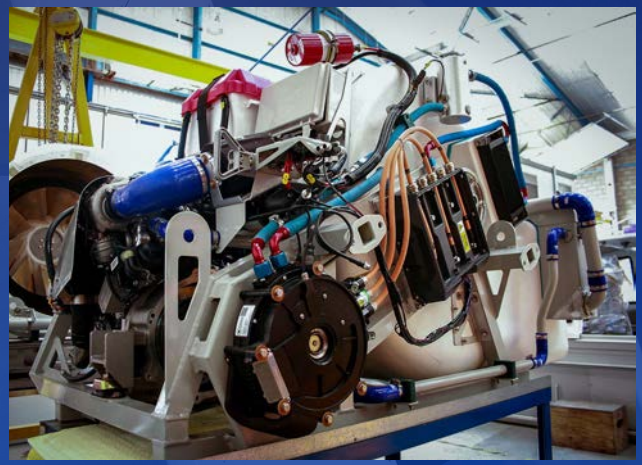
Aluminium Bonding

More payload has been made available by reducing craft weight. An aluminium bonding to process to manufacture the 995ED and replace welding reduced overall weight by 25%. Hull integrity has also been improved with structural distortion kept below 1mm.

Electric Drive

The azimuthing ducts and craft propulsion in the 995ED are powered through an electric drive axial thrust motors. This adoption of electric drive pushes towards future proofing hovercraft design and allows for improved craft balance, easier maintenance and weight saving.



Propulsion & Lift

For the 12000TD, 5 bladed 3.5m variable-pitch ducted propellers were used. This allows for the propellers to be run at slow "tip speeds" reducing the craft noise profile. Space saving mixed-flow lift fans are used that operate with increased efficiency allowing for greater general arrangement control.

OUR FACILITIES

We are based on the South Coast of the United Kingdom at the heart of the world's hovercraft industry in Southampton. Our facilities have been built from the ground up to support production and innovation of large craft built to internationally recognized standards and certifications.

Our main production facility hosts 55,853 square feet of interior space for multi-project capacity and lean production lines. This main facility is supplemented by dedicated buildings for accommodating the specialised equipment and personnel required to produce all aspects of craft fulfilment.

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Dedicated Production (11,684 sq ft):

- Skirt Production Facility

Specialising in the production of Griffon's open loop segment skirt system, developed for durability and stability. This provides efficient lift in harsh operational conditions.

- GRP Production

Precision led GRP production for lightweight aerodynamic hovercraft components.

- Paint Shop

The paint shop staff's engineers are focused on protectively and aesthetically coating the craft and craft components to specification.

GLOBAL GRIFFON

Over 180 craft, over 40 countries

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