Define your submarine missions, we’ll design the saddles...

INNOVATIVE AND MODULAR SOLUTIONS

Concept
Submarines dedicated to coastal operations in shallow waters must by nature have a reduced size. This leads to a paradox:
■ on the one hand, they have a reduced payload capability,
■ on the other hand, they must fulfill the wide panel of missions specific to coastal areas.

However, taking into account their autonomy and endurance, it can be admitted that they won’t have to execute all this panel of missions at each “sortie”, and that they can be prepared specifically in their home base.

This led DCNS to develop the technology and systems required to install modular saddles, dedicated to specific activities, mainly for littoral special operations.

DCNS expertise at your disposal to design saddles for:
■ ANY SUBMARINE,
■ ANY TYPE OF MISSIONS,
■ ANY EXISTING EQUIPMENT REQUIRED BY CUSTOMERS.
**SDV integration**

SDVs launched from a submarine allow the stealthy deployment of divers, with a large amount of equipment, while sparing their physical efforts. The carrying submarine can stay in safe waters during the whole operation.

DCNS has studied removable saddles, enabling the submarines:
- to carry, deploy and recover SDVs,
- to charge through specific interfaces SDV’s batteries and gas bottles, and exchange mission data with its navigation system.

**Dry containers**

Special operations forces may require equipment too big to fit inside the submarines or go through the hatches, and withstanding limited pressure. That’s why DCNS proposes to carry dry containers:
- stored outside and watertight down to submarine maximum operating depth,
- designed to be easily handled by divers,
- releasable to be opened close to the surface.

**A “turnkey” solution**

DCNS stands ready to study the integration of any SDV proposed by customers. However, a complete development is already led with the SPHYRÈNE®, proposed by the company ALSEAMAR. This last-generation flexible SDV can fulfil the most demanding operational requirements, in terms of range, discretion and capabilities.

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**Characteristics of Swimmers Delivery Vehicle SPHYRÈNE®**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Length: 8 m – Diameter: 1.4 m – Weight: 4 t</td>
</tr>
<tr>
<td>Submerged speed</td>
<td>Up to 9 kts</td>
</tr>
<tr>
<td>Endurance</td>
<td>Up to 120 Nm</td>
</tr>
<tr>
<td>Example of payload</td>
<td>6 divers // 2 divers with 2 m³ of equipment</td>
</tr>
<tr>
<td>Depths</td>
<td>Operating from 0 to 25 m / Watertight at 100 m</td>
</tr>
</tbody>
</table>
**Operational interests**

Many UUV are available on the market. Their integration on a submarine will allow execution of high-risk missions, without putting submarines’ or divers’ safety at stake. These UUV can be adapted to a wide array of missions:

- intelligence gathering above or under the surface,
- environment analysis,
- mines laying,
- communications,
- equipment delivery,
- decoy to enemy sensors or weapons.

**DCNS axis of research**

DCNS has focused its R&D efforts on the integration of UUV on submarines, one of the most demanding aspect being the recovery of the UUV. An original patented solution has been developed and successfully tested at sea on real conditions, using drones operated by DCNS or IFREMER. The UUV recognises specific beacons placed on the submarine sailing at a straight course, and enters its dedicated container without any human intervention.

This technology and the required interfaces between submarine and the drones can be adapted to other UUV chosen by customers.

![Autonomous docking of IFREMER's UUV into submarine saddle container](image-url)
Our single expertise for multiple possible uses...

Mines laying
Submarines are the ideal tool for offensive mines laying, since they can enter enemy waters without being detected. The deterrence effect is huge, since opponent forces must consider that all areas could be potentially mined. DCNS mine saddles present many advantages compared to mine-launching by torpedo tubes:

- important number of mines,
- very short period between each dropping,
- no impact on the trimming of the submarine,
- torpedo tubes remain available for submarine defence.

Opened to all needs
The expertise to design and build removable saddles opens a wide panel of possibilities, some of them remaining to be imagined.

For example, DCNS has already gone through studies of saddles to store extra fuel or use remote operated vehicles.

DCNS engineers, mastering the tools to design such complex systems as aircraft carriers or SSBN, stand ready to answer all needs that could arise in tomorrow’s submarine warfare.