Research and development

One of HHLA's strategic objectives is to continuously improve the efficiency of its operating systems, and consequently its competitiveness, by developing application-oriented technologies. The main focus of these activities is therefore on engineering and IT-based innovation projects. Due to close collaboration with technical universities, institutes, industry partners and government authorities, joint projects can be planned, managed and developed by working groups.

In the 2018 financial year, HHLA mainly focused its resources and available capacity on research as part of the subsidy programme for Innovative Port Technologies (IHATEC).

Container terminal 4.0

The Container Terminal Altenwerder (CTA) is one of the most highly automated container terminals in the world. Since it opened in 2002, HHLA has constantly been researching and working on improving and expanding automation at the site. Right at the start, a paradigm was established whereby automated work areas are separated, isolated and off-limits to staff in order to guarantee occupational safety. This principle has always been upheld. Today, however, this paradigm is preventing the ramping up of the automated processes as it inevitably excludes them from areas used by people. The research project "Container terminal 4.0 – a paradigm shift in the automation of container terminals via human–machine interaction rather than separation" is to be conducted as part of the German government's Innovative Port Technologies (IHATEC) incentive scheme. The project's main objective is to develop automation solutions for various container crane systems used at the terminal in work areas shared by people and machines (e.g. alongside ships and trucks) and to implement them as prototypes. At the same time, the experience, knowledge and evidence gathered during this process should play a fundamental role in establishing the safety standards needed to create a reliable framework for future automation projects.

Further development of HVCC software

Also as part of the IHATEC subsidy programme, the Hamburg Vessel Coordination Center (HVCC) continued the project "HVCC software – further development of interface- and real time-based software for the cross-operator coordination of barges, feeder ships and mega-ships at a universal and multi-terminal port with nautical restrictions". The aim is to expand the software to incorporate the various operators involved in ship calls. This could eliminate redundant working processes and improve data quality. The project's main aims are as follows: Adapt the port to the challenges posed by persistent growth in the volume and size of container vessels. Boost international competitiveness and avoid unnecessary and inefficient transport, thus reducing the environmental impact. Accelerate the use of digital networks in maritime logistics and the port industry while making more effective and efficient use of the infrastructure of the Port of Hamburg and its upstream waterways.

SustEnergyPort

SustEnergyPort is another IHATEC project being conducted by Hamburg Port Consulting GmbH (HPC) to enhance energy sustainability in the port sector. As part of this project, a structured, model-based process is to be developed and filled with content to enable port operators to identify suitable measures for improving their energy sustainability, thereby minimising their environmental impact and enhancing their profitability. The aim is to develop a structured process which will equip ports and terminals to achieve targeted improvements in their energy sustainability.

Heat treatment unit

UNIKAI Lagerei- und Speditionsgesellschaft mbH has developed a worldwide unique technology for preparing vehicles for pest-free export to Australia and New Zealand. As of 1 September, goods being exported from Germany to Australia or New Zealand have to be fumigated or heat treated due to the appearance of the brown marmorated tree bug (Halyomorpha halys). This also includes all vehicles that UNIKAI sends to Oceania. The new process involves converting forty-foot reefer containers into heating containers – a flexible, mobile and ecologically sound solution that is also attracting great interest beyond Hamburg.

Hamburg TruckPilot

With the Hamburg TruckPilot field test, which is scheduled to run for the next two-and-a-half years, MAN Truck & Bus and HHLA are launching a highly innovative research and testing project to develop automation solutions in road transport. The aim is to analyse and validate the precise requirements for the customer-specific deployment and integration of self-driving trucks in the automated container handling process under realistic conditions. Initially, the project will involve two prototype trucks equipped with the corresponding electronic automation systems. In fully automated operation, they should be able to navigate the journey on the A7 from the Soltau-Ost junction and autonomously unload and reload within the Container Terminal Altenwerder. The project is split into three phases: in the preparation phase, which already began in 2018, the technical conditions must first be defined. The testing phase is scheduled to run from January 2019 to June 2020. It comprises the technical development of the system at MAN's testing centre in Munich in accordance with the specific requirements identified during the preparation phase. The structure of the subsequent field tests from July to December 2020 will be determined by the results of the preparation and testing phases and conducted under conditions similar to customer usage.

Hyperloop transport system

In December 2018, HHLA established a joint venture with the US-based research and development company Hyperloop Transportation Technologies (HTT) to explore possible applications of hyperloop technology for transporting shipping containers within the Port of Hamburg. The hyperloop concept is based on the idea of transporting people and goods at high speed through a tube. Using magnetic levitation technology, transport capsules are sent through a tunnel with a partial vacuum at speeds of up to 1,000 km/h or more. Initial plans are for the construction of a transfer station for testing purposes at an HHLA terminal in Hamburg, and the development of a transport capsule for standard shipping containers.

Performance certified

In order to document their performance, the Container Terminals Altenwerder (CTA) and Tollerort (CTT) once again completed certification in accordance with the Container Terminal Quality Indicator (CTQI) in the reporting year. The standard, which was developed by the Global Institute of Logistics and Germanischer Lloyd, checks criteria such as the safety, performance level and efficiency of a terminal on both the water side and onshore, as well as its links to pre- and onward-carriage systems. With their successful certification, the terminals once again confirmed their high levels of performance and compliance with all quality standards.

Purchasing and materials management

Purchasing is a shared service provided by the HHLA Group's management holding company in Hamburg. HHLA Group purchasing supports corporate strategy by means of its professional management of procurement activities. The aim is to establish a consolidated supplier base that is characterised by maximum value added, top quality and optimum life cycle costs.

The strategic purchasing function supports and advises Group companies as part of its holistic management of product groups, suppliers and contracts so that the service and performance requirements of internal customers are met as completely as possible. Market developments relating to new technologies, innovations and the service performance of specific suppliers are considered in close cooperation with the operations and technology departments. In this regard, the purchasing department ensures that all Group requirements for the procurement processes are observed in accordance with the framework guidelines. These guidelines are binding for all employees.

In order to develop viable future solutions for port infrastructure, HHLA remains committed to its strategic and collaborative partnerships with selected suppliers while taking into account both economic and ecological aspects. Products, facilities and processes are systematically enhanced in order to increase the degree of digitalisation. When selecting partners, great importance is attached to reliability, quality, innovative strength, cost structure, economic stability, sustainability and compliance. Compliance with these criteria is monitored by an IT-based supplier management system. All suppliers undergo this process, especially when new potential suppliers are added. This also facilitates a continuous internal assessment. Strategic suppliers are evaluated annually by their internal customers and departments. The evaluations include experience on first contact as well as information about project procurement and processes.

We are continuing to drive the automation of purchasing processes for day-to-day requirements. In the reporting period, 25.2 % of all purchasing processes were handled fully automatically by means of e-procurement systems (previous year: 15.5 %). This enables us to streamline processes and ensure both non-bureaucratic procedures and compliance with process standards. The systematic continuation of optimisation and automation measures gives us the potential to increase the efficiency of, or fully automate, a further 14.7 % of managed processes in 2019. These steps will enable us to drive the further strategic alignment of our purchasing activities.

HHLA's supply chains comprise capital goods (such as port handling equipment) as well as consumables and other services (such as maintenance). The overwhelming majority of suppliers are from Germany and other European countries. In 2018, equipment and energy accounted for 51.0 % of the Group-wide procurement volume, while information technology (IT) accounted for 21.5 %, construction for 18.0 % and MRO (maintenance, repairs and operations) for 9.5 %. The total managed purchasing volume amounted to approximately € 294 million.

A major project in 2018 was the review of existing structures, processes and procurement systems within the purchasing department with the support of an external partner. By forming project groups, purchasing employees were closely involved in this process and helped define the requirements for HHLA's purchasing organisation in the areas of digitalisation, training concepts, KPI systems and catalogue management. In this way, the groups were able to harness existing knowledge and experience as fully as possible. The initial results of this work have already been implemented and have led, for example, to a strengthening of personal responsibility.

On the basis of these findings, we will continue to optimise processes and expenditure. Purchasing initiatives with a wide range of objectives have already been defined. Corporate departments will be involved even more closely in procurement processes in future, and cooperation between internal customers will be further intensified. The aim is to optimise procurement costs, to boost efficiency by streamlining the