

HORIZON
2020

Development and Manufacturing of Intelligent Lightweight Composite Aircraft Container

Results in Brief



Robotics and sensors support cargo handling and monitoring

An intelligent cargo container with a robotic platform does for airplane cargo loading and unloading what we all wish we could do with a household move.



© KAMONRAT, Shutterstock


Moving is a challenge. Fortunately, although at great expense, moving companies can get your boxes and furniture to their designated rooms after the move. Imagine if all your boxes and furniture had remotely controlled, self-propelled robotic platforms to take them to their specified places, secure them, and even send you wireless information about their positions, potential damage and more.

The EU-funded [INTELLICONT](#)  project has developed an innovative, intelligent, lightweight aircraft cargo container, or [unit load device](#)  (ULD), by the same name to do just this with airplane cargo.

The pros and cons of ULDs and their logistics


ULDs are large, mostly aluminium shipping containers. They are critical to securing loads from take-off to landing, particularly during turbulence. Without them – or if they

are not secured properly in the cargo hold – movement can not only damage the cargo and aircraft but also impact safety due to shifting weight in the airplane.

Despite significant advances in aircraft technology, the logistics associated with them have not changed much over the decades. “Movement of ULDs requires personnel, special handling equipment on the ground and a permanent aircraft loading system in the cargo bay, including a heavy roller floor to move the cargo containers to their final positions,” explains Elias Kokkotas, CEO of project coordinator [AMS AERO](#) , formerly Avionics Greece.

Further, airlines operate in a highly regulated environment. Cargo handling has largely been outsourced for the last half century, making ULDs the only parts of the aircraft that leave the airline’s jurisdiction and return after passing through ‘unregulated’ hands. This enhances the need for continuous monitoring and control.

Wireless and robotic technologies for ULD movement

“The unparalleled [INTELLICONT system](#)  consists of a robotic platform (RP) and an intelligent lightweight aircraft cargo container. Made of aluminium and fibre-reinforced polymer, the composite slashes weight by approximately 40 % relative to conventional ULDs. The RP and ULD are both integrated with sensing capabilities and connected wirelessly to a human-machine interface,” states Kokkotas.

Gone are the large and heavy roller floors, replaced by a strip of magnetic tape along which are delineated ‘parking’ spaces with QR codes marking the positions for loading and unloading of ULDs. The ULDs have QR codes for recognition by the RP. The RP autonomously moves along the magnetic tape, identifying either the ULD for loading or the space for unloading. A camera-based precision docking system enables the RP to align for loading and unloading with submillimetre accuracy. On arrival, the RP activates the locking mechanism and returns for reloading.

Enhanced tracking, monitoring and control

“INTELLICONT’s integrated sensors send continuous wireless information to the cockpit regarding its position, lock status, internal temperature, fire or smoke status, and indications of shock or impact. This eliminates the need for fireproof liners and central fire extinguishing systems, further reducing aircraft weight and maintenance costs,” Kokkotas says. It also eliminates the need for specialised ULDs with temperature monitoring or fireproofing.

The INTELLICONT solution can be adapted for suitcases and consumer travel, and it can be further developed for applications in cybersecurity. It will lead to lower fuel

consumption meaning lower cost and fewer emissions, and it paves the way for newer lightweight aircraft designs.

Keywords

INTELLICONT

ULD

aircraft

robotic

cargo container

airplane

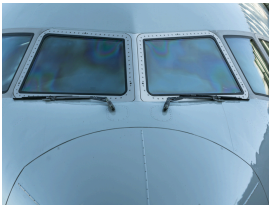
wireless

sensors

unit load device

composite

Discover other articles in the same domain of application



Hydrophobic aircraft windscreen coating advances to next phase

30 April 2021



A cost-effective and eco-friendly aeroengine concept supports small air transport

22 September 2020



Pushing the EU to the forefront of the battery sector

14 October 2022





Taking a step closer to rogue drone-free airports

11 August 2022



Project Information

INTELLICONT

Grant agreement ID: 785472

[Project website](#) 

DOI

[10.3030/785472](https://doi.org/10.3030/785472) 

Project closed

EC signature date

12 February 2018

Start date

1 March 2018

End date

30 November 2021

Funded under

SOCIETAL CHALLENGES - Smart, Green And Integrated Transport

Total cost

€ 2 506 234,75

EU contribution

€ 1 999 944,86

Coordinated by

ABIONIX GKRIS ANONIMI
ETAREIA EMPORIA KAI
YPIRESIES ILETRONIKON
SISTIMATON



Greece

Last update: 22 July 2022

Permalink: <https://cordis.europa.eu/article/id/436679-robotics-and-sensors-support-cargo-handling-and-monitoring>

European Union, 2025