



# SPICE

## The future galleys

Ever since the first generation of large passenger aircraft were introduced in the late 1960s, galley architectures have been constructed around the omnipresent trolley. It is hard to imagine the airline world today without these trolleys, but an increasing number of Airbus customers have been voicing the question of whether the time has come, after 40 years, for the air transport industry to look into new architectures for galleys.

To study this question, Airbus spent nine intensive months on-site, with three leading airlines. This work generated a large body of knowledge concerning the issues experienced with today's galleys, as well as the types of solutions that are required. To make use of the knowledge, Airbus initiated a project called SPICE (SPace Innovative Catering Equipment) which promises to make significant progress in improving galley designs.



**Daniel PERCY**  
Airbus Marketing Manager  
Aircraft Interiors Marketing

## Modernising galley architecture without disturbing today's processes

The SPICE project found that the main hurdle to achieving true innovation in galley architecture and therefore, to bringing significant benefits, was the trolley itself. Thinking out of the box, or out of the trolley in this case, revealed that the true building blocks of airline catering are the trays or drawers which are put into the trolleys.

SPICE galleys are therefore based around the dimensions of the trays used in today's most popular galley standard, ATLAS. However, SPICE makes three key changes to the storage architecture.

The first architectural change is to store trays and drawers in light-weight boxes, instead of trolleys. The boxes are then moved around the cabin by Folding Service Carts (FSC), which stay on-board the aircraft and remain in a suitable condition for presentation to customers. A typical widebody aircraft will need 8 to 10 FSCs.

The second architectural change is to satisfy airworthiness requirements using the galley instead of the trolley. Today, trolleys are certificated to withstand '9g' loads and to be flameproof.

With SPICE, these requirements are satisfied by the doors on the galley itself.

The third architectural change is to create a system of modular sizes between the different elements which go into the galley. The boxes used in SPICE galleys come in three sizes which relate to each other in the same way, as paper sizes such as A4-A3-A2, each being twice the size of the previous one. In addition, the Galley Inserts (GAIN) such as ovens and beverage makers, also use the same modular sizes.

## Architectural efficiency

These architectural changes make it possible to bring about significant efficiency improvements.

Using boxes and FSCs, stored behind '9g' doors on the galley, helps to reduce weight from the aircraft catering equipment. The boxes themselves no longer need wheels or brakes and the lack of '9g' structure means that any material can be used in the box construction. Boxes made of metal, plastic and even cardboard, have been designed for use with the SPICE galley. A typical SPICE Meal Box can weigh as little as 6kg when made from plastic. This, compared to today's trolleys which have traditionally weighed anything in the range from 21 to 30kg, leads to significant fuel savings.

**1** Chilled upper compartments

**2** Transfer table

**3** Storage galley

**4** Flexible stowage

**5** Service box

**6** Half-size meal box

**7** Meal box



SPICE saves space as well as weight. When thinking about one of today's galleys, it is evident that above the trolleys there is a lack of geometrical optimisation caused by the various different shapes of equipment. In contrast, the modularity of the boxes and equipment which go into the SPICE galley design ensures that no space is wasted.

Additionally, space is won in SPICE galleys through making ergonomic improvements. With today's galleys, cabin crew have to perform all lifting and carrying tasks manually. Therefore, in order to control the ergonomic impact on the cabin crew, limitations are required on the number and weight of the boxes which can be stored in the galley. SPICE introduces a device called a Transfer Table, which saves the need for cabin crew to lift or carry and therefore allows more boxes to be stored in the galley since they can be stacked higher up.

To quantify these efficiency gains, Airbus has completed numerous assessments of SPICE galleys versus delivered airline galley configurations, using airline galley loading plans for routes which have the highest catering content loaded onboard. These assessments show that the typical weight savings on an A330/A340 Family aircraft is in the range of 600kg. For aircraft as big as the A380, these weight savings can reach more than one ton. The space savings usually allow to have one less galley monument, creating enough space to win two or three economy seats.

## New galley features

The architectural changes which bring efficiency improvements also allow to create a galley system which has a range of new features not available on today's galleys. Full Plug & Play exchangeability of equipment is facilitated by the modularity of GAINs and boxes. The galley and GAIN arrangements will be pre-certified, allowing significant flexibility in configuring and reconfiguring the galley arrangement, with an equipment swap taking only five minutes.

Chilled upper compartments are possible due to the '9g' galley doors being installed at both levels. This gives much more flexibility in galley packing, allowing the meal and drink items to be placed in the upper part of the galley without the need for dedicated 3-mode chillers, as used today.

Customisable service items can be created to be used directly in the service. Because SPICE boxes don't need to be certified and that the SPICE Service Box (similar to today's Standard Unit) is tall enough to stand bottles upright, boxes can be designed ergonomically optimised for in-flight service which can even be pre-prepared by the caterer. This ensures that preparation times are reduced, allowing the passengers to benefit from a quicker service.

**8** Folding Service Cart (FSC)

**9** Meal service

**10** Drinks service

**11** Waste collection

**12** Plug & Play equipment

**13** Preparation galley

**14** Sliding doors



## Testing the concept with airlines and caterers

Clearly, making all these changes to galleys creates a need to learn how to use the new features, design ways to use the galley efficiently and to validate the processes on ground and in the cabin. For this purpose, Airbus has built prototype SPIICE equipment and has been working together with industry partners.

In cooperation with airline cabin crew, who spent over one month in planning and executing cabin trials, the usability of the new galley features, such as the Foldable Service Cart (FSC) and the Transfer Table have been successfully tested and SPIICE service routines developed.

These tests revealed a fast learning curve for cabin crew in adapting from today's world to SPIICE. The crew confirmed that SPIICE's design improved ergonomics, and that the use of pre-prepared service items enables to reduce service times.

Airbus has also been working with the top airline caterers to ensure that SPIICE can be integrated into their existing facilities and processes. The first step has been to design the ground equipment the caterer will use to transport SPIICE Meal Boxes. Testing of this device has shown that SPIICE Meal Boxes can be transported in the same way as trolleys.

Tests in the caterers' facilities identified that it was fully possible to integrate SPIICE with minimal or no adaptation, to existing equipment such as trolley conveyor systems, and washing streets. Finally, testing of the galley loading with the caterers revealed that SPIICE galleys can be expected to be loaded in equivalent times to today's galleys.

## The challenge of changing galley standards

Changing a system which has been in place for over 40 years naturally introduces, not only major benefits, but also a major challenge due to the impact of dispatch operations. Ultimately, it is a question of whether the benefits outweigh the temporary additional cost, created by operating dual standards over the changeover period.

The main changeover cost is caused when an aircraft with one galley type is swapped for an aircraft with another galley type, after the catering has already been prepared. This causes a dispatch delay as the new aircraft is re-catered.

The other significant cost for airlines may be slightly higher prices from the caterers, since they will need to purchase the SPIICE ground equipment. Additionally, the caterer will need to store equipment for both today's galleys and for SPIICE galleys which increases the amount of floor space rented.

Fortunately, these extra costs are more than offset by the benefits of SPIICE. Even in a conservative assessment of a mixed fleet scenario, where SPIICE equipped aircraft are operating alongside non-SPIICE equipped aircraft, it can be shown that on average each SPIICE large passenger aircraft generates an additional US \$1.5 million NPV (Net Present Value) over its life.

This significant finding means that the transition to SPIICE does not require retrofits. However, if the airline wished to retrofit existing fleets with SPIICE, a business case analysis has shown a payback period as low as three years. This is a significant improvement on business cases for retrofitting today's galleys.



## The vision for SPICE and the programme in 2010

Airbus' vision for SPICE is that it should become a new industry standard, open to all, for use on aircraft produced by all the airframers.

To this end, Airbus is working with industry organisations to ensure that the standard for SPICE equipment and its interfaces is set at the start.

Industrially speaking, the goal is to be able to deliver the first passenger aircraft with SPICE galleys installed in the second half of 2013. However, this is contingent upon the readiness of the market. Under consultation, participating airlines have provided extensive

feedback on what is required to move forward. As a result of this dialogue, Airbus will complete a number of additional trials and development activities.

To allow airlines to validate weight and space savings and prove their individual business cases, a full A330 economy cabin demonstrator is currently under construction.

This facility will also be used to complete trials, benchmarked against today's operation, for the aircraft turn-around-time and for in-flight service.

In conjunction with known galley and equipment suppliers, the development activity will continue.

This work will focus on maturity and reliability, and on establishing detailed technical performance of the galley system.

Also, an A320 Family version of the SPICE concept will be created.

### CONTACT DETAILS

**Daniel PERCY**  
Marketing Manager  
Aircraft Interiors Marketing  
AIRBUS Central Entity  
Tel: +33 (0)5 62 11 76 33  
Fax: +33 (0)5 61 93 32 73  
daniel.percy@airbus.com



## Conclusion

The architecture of galleys has not changed in over 40 years, since the introduction of the first large passenger aircraft. Several airlines which recognized this asked Airbus to take the lead in introducing innovation in this area. After considerable research, Airbus conceived a new type of galley system, called SPICE (SPace Innovative Catering Equipment). SPICE makes a number of architectural changes compared to today's galleys, including introducing a system of modular boxes which are moved by Folding Service Carts.

Key benefits of SPICE for airlines include weight savings of 600kg and space savings, enabling 2 or 3 extra economy seats to be installed. Several ergonomic advantages for cabin crew are also introduced, including lifting assistance using a device called a Transfer Table.

'Plug & Play' modularity of galley inserts, chilled upper compartments and reduced service times are additional interesting features.

Airbus has already completed testing of SPICE prototype equipment. This includes testing of cabin service, where actual airline cabin crew served seated passengers. It has also been tested with caterers, making sure they can cope with SPICE in their facilities and during aircraft loading. All tests have shown positive and encouraging results. Following consultation with the airlines about the conditions for launching SPICE and the final validation testing is underway.

The vision for SPICE is that it will become a new global galley standard, available for the whole industry.