Modular Galley Concept Presentation

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Zodiac Aerospace – The Company
Historic galley design
Attempts at changing galley concepts
What do airlines want?
Revolutionary single aisle galley design with maximum flexibility
Focused innovation at Zodiac Aerospace galleys and equipment
The birth of the Modular Galley concept
Zodiac Aerospace is:

- One of the oldest aerospace company in the world: established in 1896
- A world leader in aerospace equipment and systems
  - **Cabin Interiors** (59% of sales)
    - Turnkey Interiors, Water & Waste, Galleys, Galley inserts, Class dividers, composites, Seats, Trolleys,
  - **Aircraft Systems** (20% of sales)
    - Electrical power management, Oxygen Systems, Fuel circulation, Lighting Systems, Actuators, Windshield wipers, hydraulics and coupling, management systems
  - **Aerosafety & Technology** (21% of sales)
    - Emergency slides, Runway aircraft arrestor, Parachutes, Rafts / floatation, Specialty wiring protection, Fuel cells, de-icers, Telemetry / mission recorders
- Among the World top 10 equipment manufacturers
A global footprint

- **France**: 6,000 employees
- **US**: 10,000 employees
- **Europe (excl. France)**: 3,800 employees
- **Africa, Asia, Australia, Middle East**: 3,200 employees

<table>
<thead>
<tr>
<th>Region</th>
<th>Employees</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>6,000</td>
<td>23%</td>
</tr>
<tr>
<td>US</td>
<td>10,000</td>
<td>38%</td>
</tr>
<tr>
<td>Europe (excl. France)</td>
<td>3,800</td>
<td>15%</td>
</tr>
<tr>
<td>America (excl. US)</td>
<td>3,000</td>
<td>12%</td>
</tr>
<tr>
<td>Africa, Asia, Australia, Middle East</td>
<td>3,200</td>
<td>12%</td>
</tr>
</tbody>
</table>

26,000 + employees

ZODIAC GALLEYS & EQUIPMENT
Zodiac Aerospace expertise

- Turnkey integrated systems
- Innovative and break-through designs
- A Tier 1 risk-sharing partner position for future aircraft platforms
- Zodiac Aerospace expertise acknowledged by a large customer base…
  - Boeing, Embraer, Airbus, Bombardier, Eurocopter, Dassault, Irkut, Sukhoi, Gulfstream, COMAC, …
- …and its selection on all recent commercial airplanes such as
  - ERJ 170/190, A350XWB, B787, A380, CSeries, CRJ1000/900, G650, F7X, B747-8, MC21, C919 …
Presentation Focus

• The impact that innovative galley design can have on what happens on board an aircraft

• How new galley concepts can enhance the experience for passengers (and crews)

• Galleys may enable extra value services that airlines may want to provide to their customers
# Historic Galley and Galley Insert Standards

<table>
<thead>
<tr>
<th>“Standard” sizes</th>
<th>Initiator</th>
<th>Today status</th>
</tr>
</thead>
</table>
| **ATLAS**        | • Air France  
                  • (T)Iberia  
                  • Lufthansa  
                  • Alitalia  
                  • Sabena    | • Approx 80% of the World Market  
                  • Not interchangeable |
| **KSSU**         | • KLM  
                  • SAS  
                  • SWISSAIR  
                  • UTA    | • Decreasing (move to ATLAS) but still supported by big carriers (e.g. KLM)  
                  • Not interchangeable |
| **Unique**       | • UAE (Ovens-ACE)  
                  • QFA (Ovens)  | • Stable, still alive  
                  • Not interchangeable |
| **ARINC**        | • ARINC members | • 5 standardized sizes  
                  • Interchangeable  
                  • Standard B787 & A350 |
| **SPICE**        | • AIRBUS  
                  • world leading airlines  
                  • world leading Caterers | • 2 standardized sizes  
                  • Interchangeable |
Why Has the ATLAS Standard Galley Lasted for More Than 40 Years?
Transition from ATLAS to SPICE – Huge Leap
SPICE Overview – Developed by Airbus

High Density Galley
(Storage Station)

Preparation Galley
(Work Station)
SPICE Preparation Galley (Single Deep – GAIN)

Foldable Service Cart (FSC)

Customizable area

Storage area (customizable per catalogue)

Main GAIN area (customizable per catalogue)

Basic storage / 2nd GAIN area
SPICE High Density Galley (Double Deep GAIN)

- Basic storage area
- Main GAIN area (customizable per catalogue)
- Basic storage area/ 2nd GAIN area
SPICE – Foldable Service Cart

Heavy Trolleys replaced by Folding carts and light-weight Boxes

6 to 12 Foldable Service Carts stay on board at all times.

ATLAS size meal trays are put into boxes, and the boxes are put into and onto the Carts.

A customisable trolley or a dolly is used by the caterer for loading / unloading.
SPICE – Sliding Doors

Sliding Doors certified to 9G form fully closed, fireproof refrigeration compartments

When closed, the sliding doors create a fully sealed refrigeration compartment.

Open doors do not interfere with Transfer Table nor Crew workspace.

The compartment is also 9g capable and fireproof. The boxes therefore have low certification requirements.
HISTORICAL INNOVATIONS
INTEGRATED GALLEY

SPICE

PROS
- Space Efficient
- Seats Could be added
- Weight Efficient
- Ergonomic and Aesthetic
- Only two GALLEY standard sizes
- Only 2 GAIN sizes

CONS
- Entire logistics cycle impacted / affected.
- Some loss of work deck space.
- Single point of failure issues
- Reliant on Induction oven
- Competed with the ARINC standard
Aircraft Service Logistics (ASL)

- Project partners

  - Airbus Deutschland / Germany
  - Deutsche Lufthansa / Germany
  - Driessen Aircraft Interior Systems / Netherlands
  - Fuselage Engineering Services / Israel
  - GateGourmet International / Switzerland
  - Israel Aircraft Industry/Bedek Group / Israel
  - Technical University Berlin / Germany
HISTORICAL INNOVATIONS

ASL (Aircraft Service Logistics)

**PROS**
- Space saving in main cabin
- Allows significantly more revenue seats

**CONS**
- Reduces space in cargo
- No workspace area to prepare food
- Single point of failure issue
- Not flexible regarding where galley is installed
What do Airlines Really Want?

- **Catalogue products**
  - Pre-engineered and pre-qualified
  - Modularity fully available post-delivery

- **Improved in-flight experience & working environment**
  - Appearance
  - Ergonomics
  - Waste Management
  - Cleaning Operations
  - Catering Logistics

- **Differentiation & quality**
  - High quality, reliable and safe products
  - Reduced weight, increased lifecycle value
  - Improved maintainability
  - Branding opportunities

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17 April 2013
Airlines Want Modularity
Modularity

- Catalogue approach: improving and extending the MaxFlex concept for maximum configuration freedom within a baseline
Modularity

- Galley modularity is fully available post-delivery
- Allowing for quick re-configuration
  - Meeting seasonal catering demands
  - Changes in flight routes/new destinations
  - Evolving service concepts
  - New functionalities/innovations becoming available
Airlines Want Differentiation

- Airlines have the possibility to differentiate by upgrading the galley appearance using existing kits
Differentiation

- Airlines have the possibility to differentiate by upgrading the galley appearance using existing kits
- Using Airline specific colors and patterns
Differentiation

- Airlines have the possibility to differentiate by upgrading the galley appearance using existing kits
- Using Airline specific colors and patterns
- Alternate means of branding
ZODIAC GALLEYS & EQUIPMENT

April 17, 2013 — 29

Vision

Lead

Implement new technologies and innovations

Continuous improvement

Extend and adapt the catalogue to meet new market requests and trends
Modular Galleys for Wide Body Aircraft

Amazing flexibility in design, seasonal configurations & revenue enhancement
Extending Modular Concept to Wide Body Aircraft

Overview

1. Core Galleys: 3-, 4- or 5-cart wide
2. Insert Modules: 3- or 5-cart wide
3. Sidewall Add-Ons:
   - Passenger Add-Ons e.g. bar
   - Crew Add-Ons e.g. carts
   Sizes: 1/6-, 1/2-, 1-, or 2-cart wide
4. Backwall Add-Ons:
   For chilling and passenger applications
5. Doors: cart doors and/or standard unit compartment doors
New Modular Galley Design Concept

Core Galley

- 4 different sizes of the Core Galley will be constructed

3-Cart Core Galley

4-Cart Core Galley
New Modular Galley Design Concept Idea

Core Galley

- 4 different sizes of the Core Galley will be constructed

5-Cart Core Galley

6-Cart Core Galley
New Modular Galley Design Concept

Galley Insert Modules
New Modular Galley Design Concept

Galley Insert Module Installation

Power and water supply

guiding rail
4xOVEN

INSERTS MODULES
Galley Insert Modules

Insert Modules: 5-Cart Core Galley

1. 3x Oven / 3x Water Heater / Stowage
2. 2x Oven / 4x Coffee Maker / Water Heater Hot Cup
3. 2x Oven / 3x Coffee Maker / 2x Water Heater Sink
4. 2x Oven / 3x Coffee Maker / Stowage / 4x Std. Unit
Add-On’s to Enhance Crew Capabilities
Add-Ons For Flight Crews

Add-Ons

- Crew Add-Ons: 1-Cart wide
- Six options with F/S cart
Extended Modularity
LIFTARM
Extended Modularity
LIFTARM
Add-On’s to Enhance Passenger Experience
Add-Ons for Passengers

Bar Unit
Self Service for Passengers
Larger Bar Unit

Large Bar Unit
Greater Self Service Opportunities for Passengers
In Multiple Colors
In Multiple Colors

All ADD ONs available IN CUSTOMIZED COLOURS.
Add On **DUTY FREE**

**Duty Free Unit Ad-On** that allows **Onboard Shopping**
Many Add-Ons to Enhance Passenger Experiences

- Welcome Area
- Library
- Counter Unit for Self Service Snacks
Many Add-Ons to Enhance Passenger Experiences

Water Bottles
Self Service

Stowage
Offering More Closet Space
Self Service Water Dispenser Ad-On
Add On WATER DISPENSER
No Illumination
WATERDISPENSER
Illuminated water fontain

Edge lighting

WATERDISPENSER
ILLUMINATION

ZODIAC GALLEYS & EQUIPMENT

ZODIAC AEROSPACE
New Modular Galley Design Concept

Amazing Flexibility

Center:
3 Core Galleys
+ 28 Insert Modules
+ 74 Add-Ons

FWD:
3 Core Galleys
+ 15 Insert Modules
+ 66 Add-Ons

AFT:
3 Core Galleys
+ 28 Insert Modules
+ 69 Add-Ons
New Galley Design Concept

Incredible Combinations

11 different Core Galleys + 64 different Insert Modules + 79 different Add-Ons = >6200 different Galleys to support full flexibility
Modular Galleys for Wide Body Aircraft
Visit our Zodiac Stand in Hall 7 to See This Galley

Amazing flexibility in design, seasonal configurations & revenue enhancement