

> Paperless Cockpit – Lufthansa Systems' Mobile Solutions

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IT that makes your life easier

The development

From EFB...

... to Mobile Solutions



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Information in the Cockpit – It all began with a lot of Clocks



The “Clock Shop“ (B747-100)

Cockpit Systems & Avionics

Manual instruments
Papers Charts, NavKits & Manuals

Ground-Cockpit-Communication

VHF-HF
Analog

Ground Systems

Independent processes & systems
Pen & Paper

Hardware



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Today, most of the Clocks have disappeared ...



Cockpit Systems & Avionics
Dedicated Displays
Semi-integrated systems & data



Ground-Cockpit-Communication
Digital / Satcom
Limited data transfer during flight



Ground Systems
Digital ground applications
Semi-integrated systems & data

Software



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... while the Display and the Integration of Information has changed dramatically

A380-800



CRJ-200



Gulfstream G-IV



- Flight relevant information can be displayed electronically
- Integration of display (e.g. PFD: altimeter, speed indication, artificial horizon, compass, vertical speed)
- Integration of data (EFB)
- Introduction of Head-Up displays in commercial aircraft
- Business aviation: Multi Functional Display (MFD) starts
- Ambition: Reduction of the task of mental integration

Information & Data



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The development

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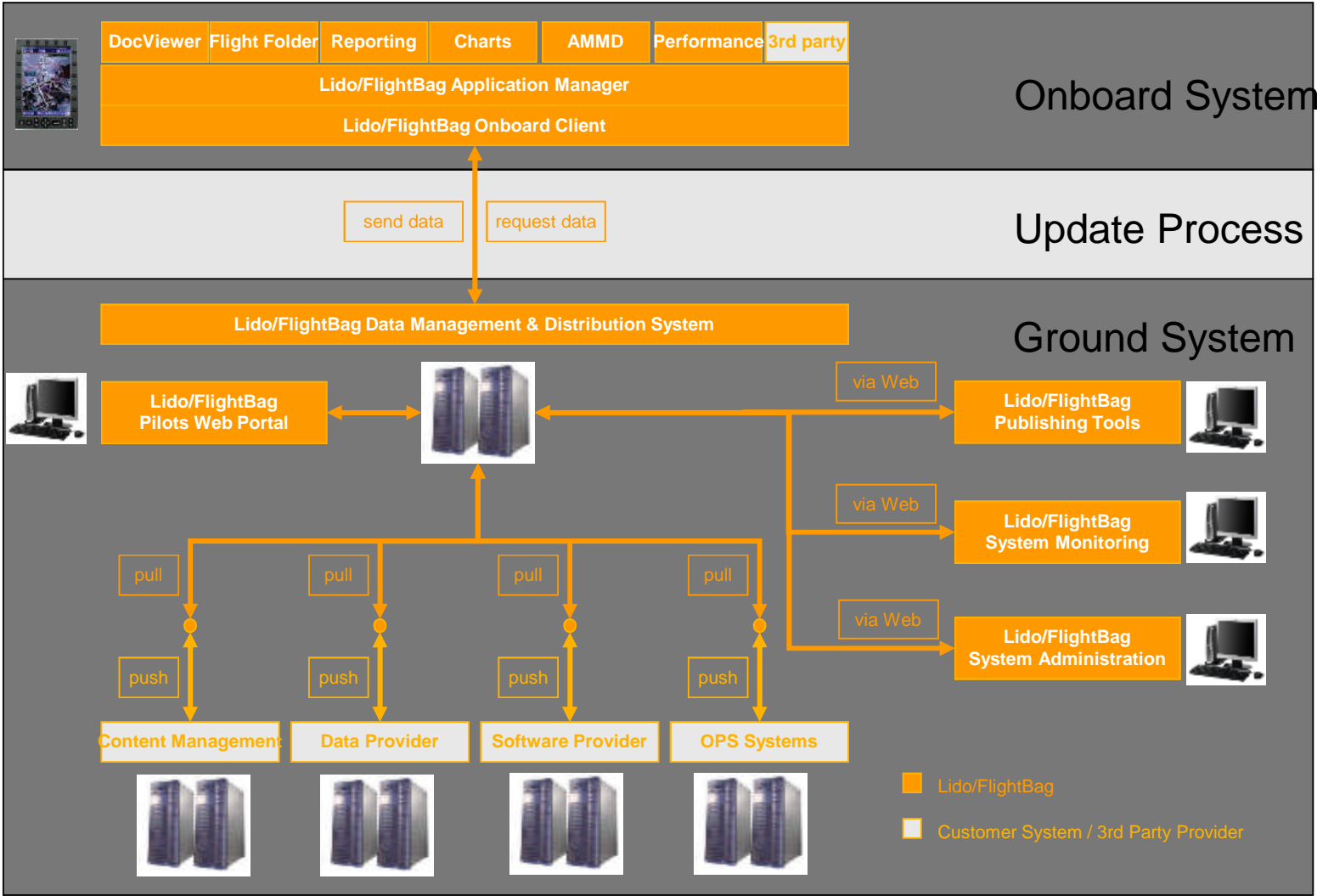
... to Mobile Solutions



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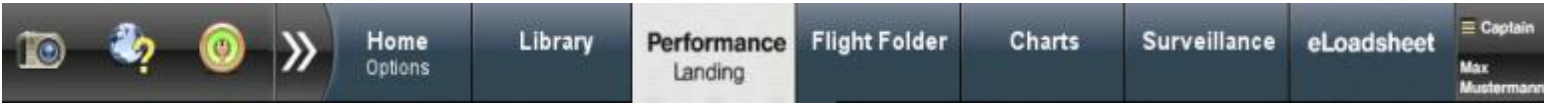
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Lido/FlightBag System Overview



Lido/FlightBag Applications

Onboard Software Suite



Integrated Lido Applications

-
-
-
-
-
-
-
-
-

3rd Party Applications

- eTechLog
- Weather Viewer
- Video Surveillance (from selected HW)
- Customer's in-house Applications etc.



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Lido/FlightBag Key Features and Benefits



Flexibility:

- Supporting different EFB Classes
- Integration of 3rd party & in-house applications
- Modular concept (from less paper to paperless)

Independency:

- Hardware independent
- Aircraft OEM independent
- One EFB system for all fleets



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Lido/FlightBag Key Features and Benefits



Flight Safety:

- Automatic transfer of data between the applications reduces the risk of manual input mistakes

Cost Reduction:

- Printing costs can be reduced significantly by the Lido eRouteManual and Library.

Future-proof

- LSY in key position at ARINC standardization (429, 633, 828, 834, 840)



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Integrated and visualized Aeronautical Information in one Application

Dynamic: permanent data updates within flight

The screenshot displays a cockpit navigation interface with a map of Europe. A flight route is shown from EDDF (Frankfurt) to EKCH (Cologne) via EDLW (Düsseldorf). The route is color-coded: blue for the planned route, red for a revised route, and orange for a link to ATM. Various information boxes are overlaid on the map:

- Arrival Info:**
 - NOTAM
 - SNOWTAM
 - AIP Weather
 - Link zu ATM
- Alternate Info:** (Pointing to EKCH)
- Digital NOTAM:**
 - Closed Airspace
- relevant SIGMET:** (Pointing to a red hatched area)
- Departure Info:**
 - NOTAM
 - SNOWTAM
 - AIP Weather
 - Link zu ATM
- Route Info (EFF):**
 - Planned route
 - Revised route
 - Link to ATM
- NavLog:** (Pointing to a black arrow-shaped area)
- Dynamic Weather:** (Pointing to a black arrow-shaped area)
- Dispatch:** (Bottom right corner)

The interface includes a 'Cockpit' header, 'Enroute (High) Lambert' map mode, 'Plan Mode', 'Pan Map', and 'Config...' buttons. A sidebar on the right contains 'GEN RM', 'Enroute', 'Clip', 'General', 'AGC/APC', 'SID', 'STAR', and 'IAC' options.

- Integrated information solution
 - Lido/Flight
 - Lido/eRM
 - Lido/FMS
- Visualized EFF
- Integrated Time & Fuel Checks (NavLog)



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The development

From EFB...

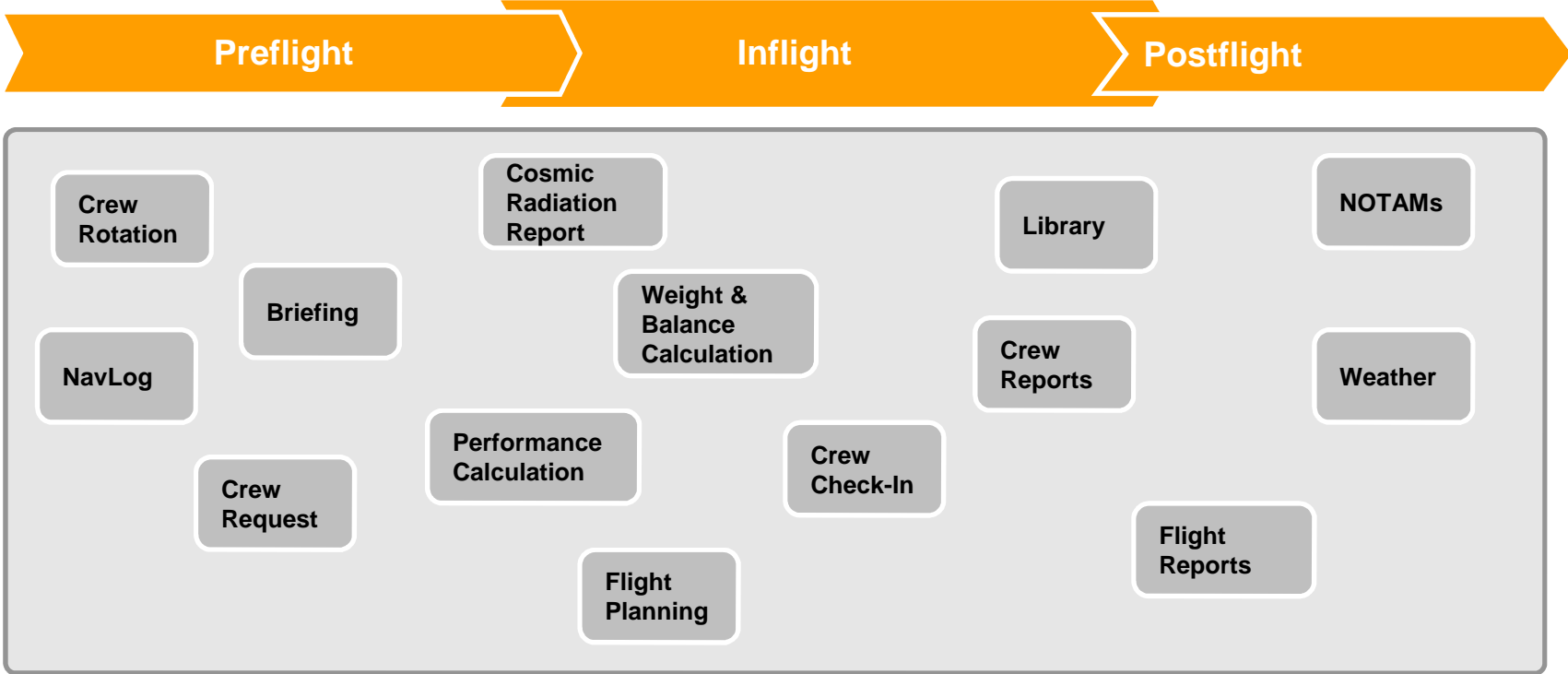
... to Mobile Solutions



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Existing and potential Mobile Applications within the Flight Process for Cockpit Crews



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Staff-related Apps

Apps / Components

- Crew rotation
- Crew request
- Crew feedback / Crew reports
- Information for connecting flights
- Check-In
- Crew list
- Training

Customer Value

- All in one
- Seamless process coverage



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Aircraft-related Apps

Apps / Components

- Document Viewer
- Library / Aircraft information

Customer Value

- Paperless operation



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Event-related Apps

Apps / Components

- Weight & Balance / Loadsheets
- Status reporting during turnaround
- Briefing
- Aircraft Performance Calculation
- Weather (overlay)
- FPL / Navlog
- Flight & Safety Reporting

Customer Value

- Paperless operation
- Direct connection to Flight Planning and Performance ground system
- Potential for inflight FPL recalculations (dependend on connectivity)



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Chart 17

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