A350
TECHNICAL TRAINING MANUAL
MAINTENANCE COURSE - T1+T2 - RR Trent XWB
Lights

This document must be used for training purposes only

Under no circumstances should this document be used as a reference

It will not be updated.

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LIGHTS

V1813401 - V01T0M0

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Cockpit General Illumination

The LEDs are used for all the cockpit general illumination.

FULL COCKPIT LED-LIGHTING

LED TECHNOLOGY

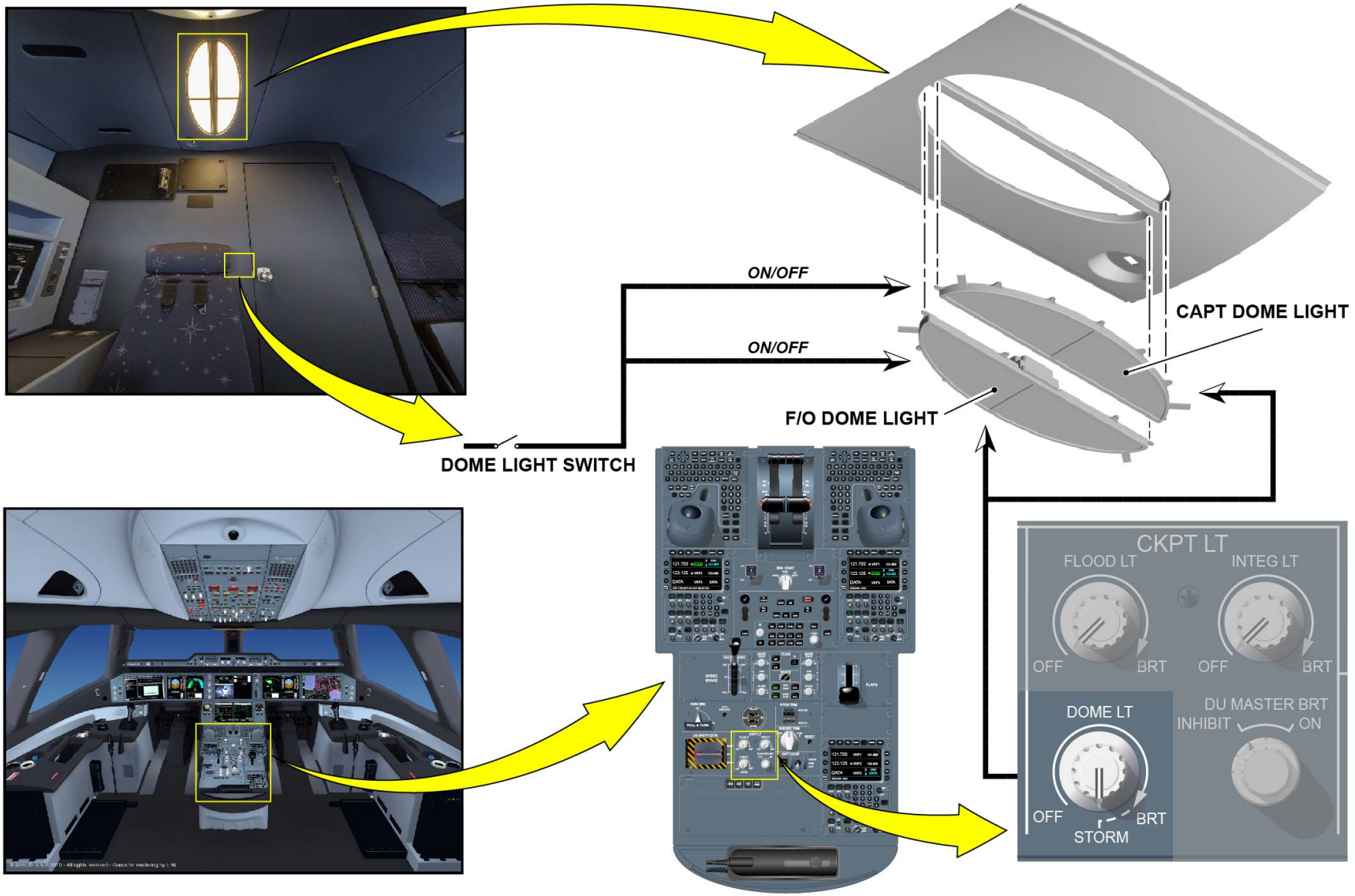
COCKPIT GENERAL ILLUMINATION

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Ambient Lighting

General ambient lighting

The general ambient lighting can illuminate all the cockpit and gives the flight crew members the correct lighting to move in the cockpit.
It includes CAPT and F/O dome lights, which are identical.
The dome lights are controlled by the DOME LT rotary knob or through a switch installed near the cockpit door.
The DOME LT rotary knob (installed on the CKPT LT section of the center pedestal) lets the flight crew members adjust the brightness level of the dome lights. This rotary knob has two positions: OFF and STORM.
A switch installed near the cockpit door is used to switch on or off the dome lights. When the dome lights are switched on via this switch, they are set to the low brightness level (5% of the full brightness).



AMBIENT LIGHTING - GENERAL AMBIENT LIGHTING

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Ambient Lighting (continued)

Storm function

The DOME LT rotary knob has a STORM position. This position is used in storm conditions to keep a high level of luminosity in the cockpit.
When the storm function is selected, the lights that follow are set at full brightness:
- Dome lights
- Main instrument-panel lights
- Center pedestal light
- Outer VU lights.

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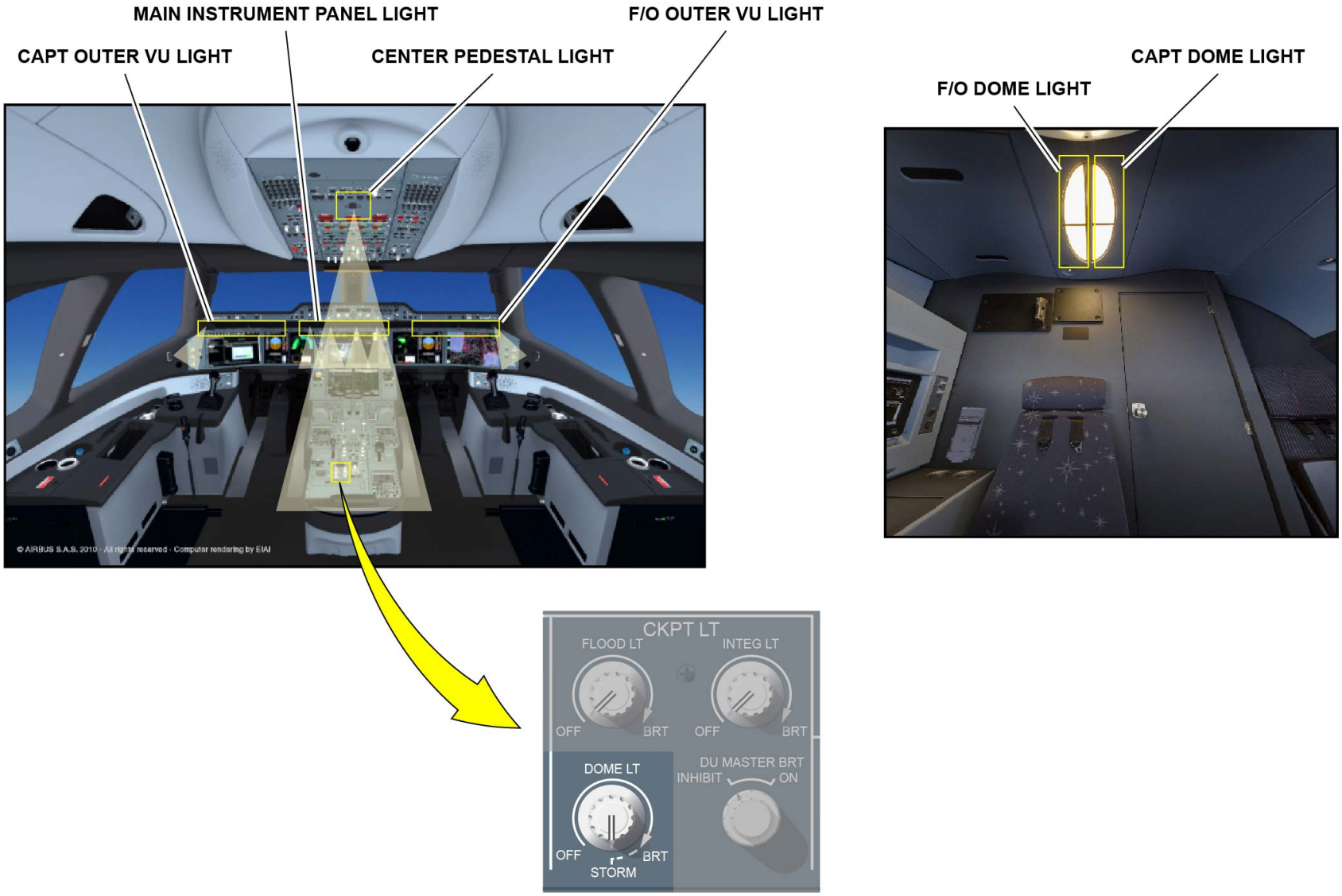


AMBIENT LIGHTING - STORM FUNCTION

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

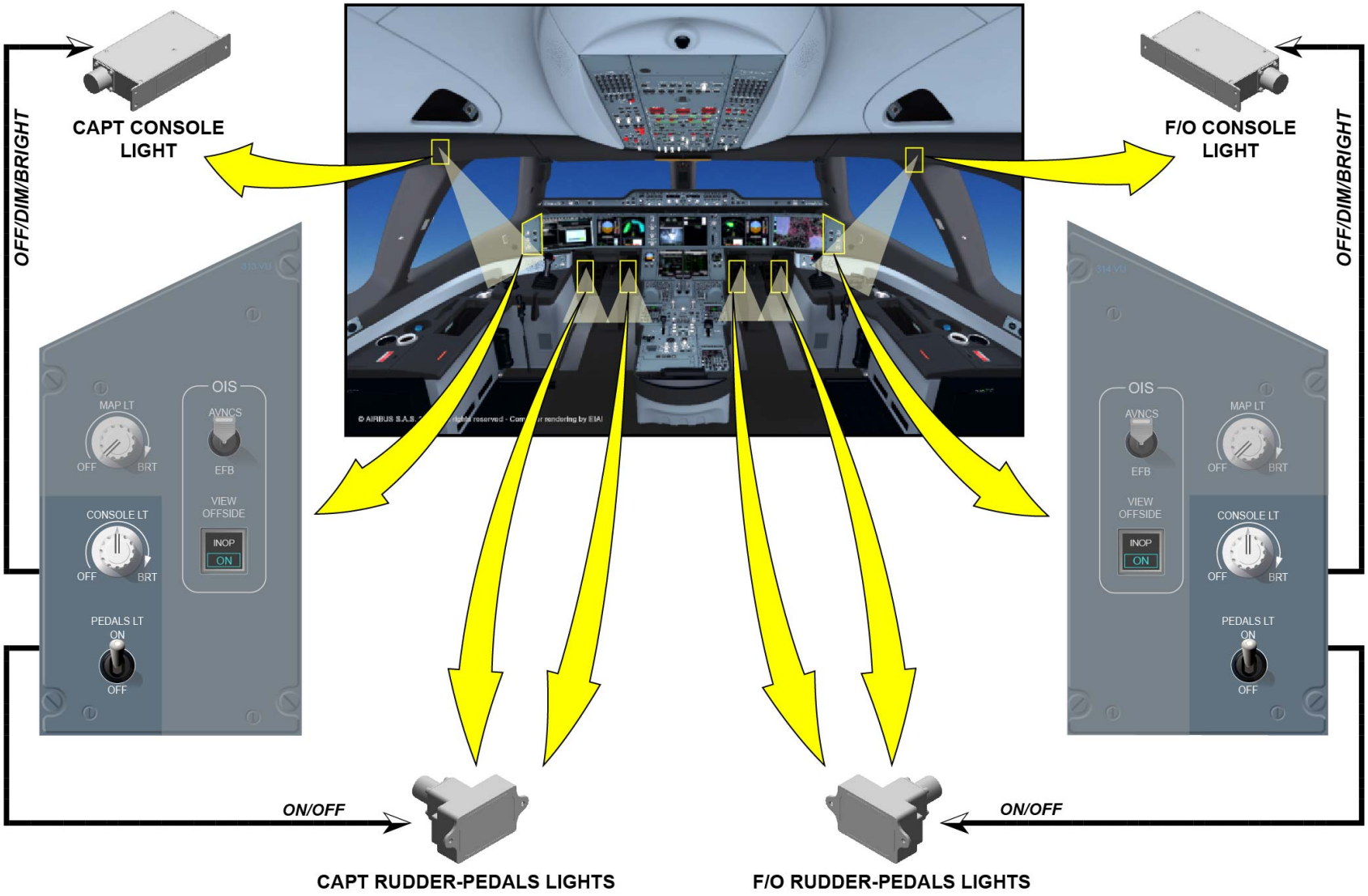
Ambient Lighting (continued)

Pilot individual working-area lighting

The CAPT and F/O individual working-area lighting includes:
- The console lights (CAPT and F/O). They can be used to illuminate the cockpit sides during maintenance or in storm conditions (in addition to the storm function).
- The left and right rudder-pedals lights. They are used to illuminate the cockpit floor.

The CAPT and F/O CONSOLE LT rotary knobs let the flight crew to adjust the intensity of the lights, from the OFF to the Bright (BRT) position.

The left and right rudder-pedals lights come on when the PEDALS LT control switch is set to the ON position.



AMBIENT LIGHTING - PILOT INDIVIDUAL WORKING-AREA LIGHTING

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Instrument Panel Lighting

Main instrument-panel lighting

The main instrument-panel lighting includes four LED lighting modules.
The two center lighting modules illuminates:
- The exchange area (area above throttle) on the pedestal.

The left lighting module illuminates:
- The panel between CAPT inner and upper Display Units (DUs)
- The panel on the left side of lower DU.

The right lighting module illuminates:
- The panel between F/O inner and upper DUs
- The panel on the right side of lower DU.

On the pedestal, the FLOOD LT rotary knob lets the flight crew members adjust the intensity of the lights from the OFF to the BRT position.
In addition, when the DOME LT rotary knob is set to the STORM position, the main instrument panel lights are set to full brightness.

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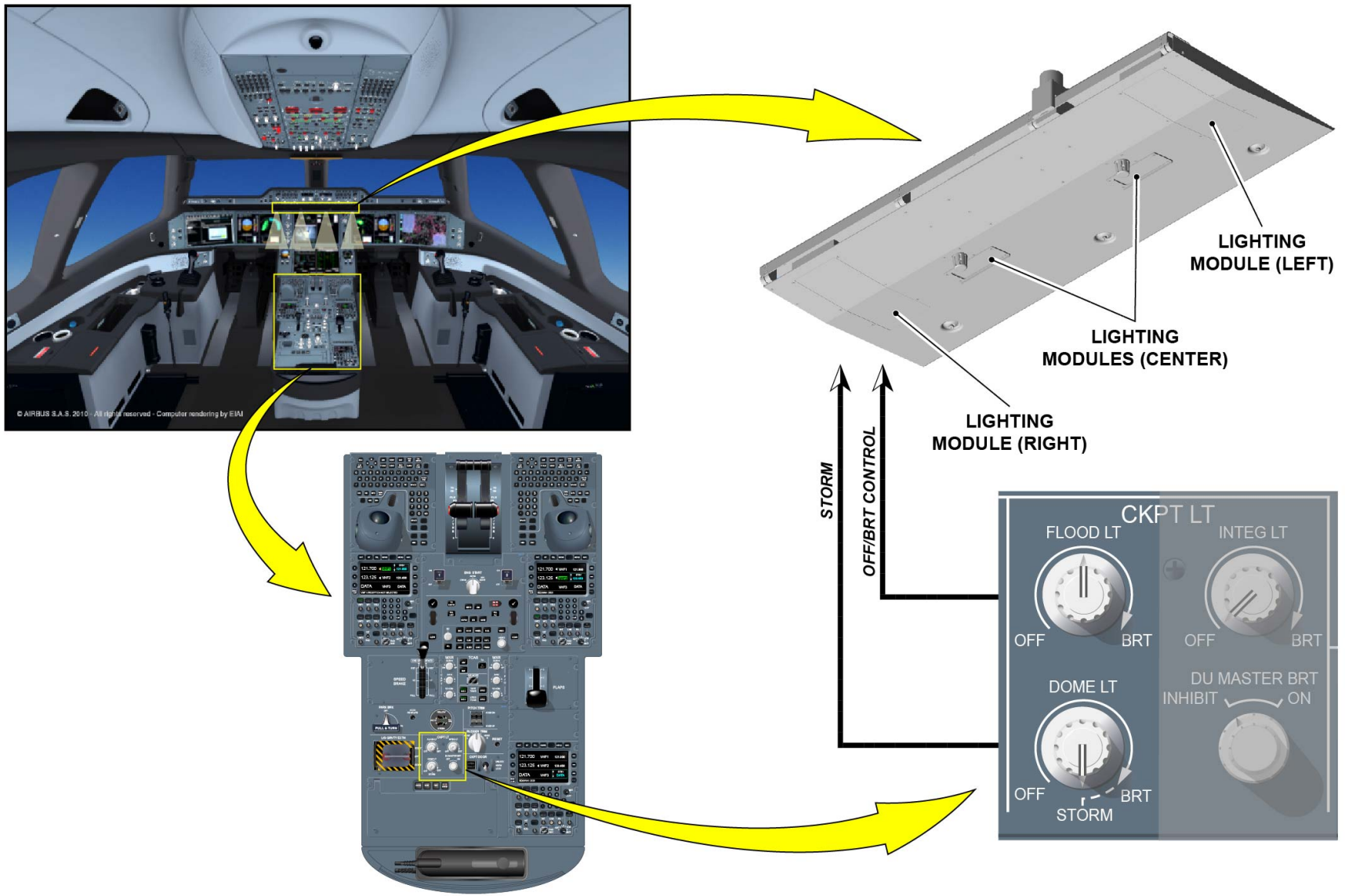

INSTRUMENT PANEL LIGHTING - MAIN INSTRUMENT-PANEL LIGHTING

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Instrument Panel Lighting (continued)

Pedestal light

The pedestal light gives the flight crew members a satisfactory view of the related area.
This light is installed on the overhead panel.
On the pedestal, the FLOOD LT rotary knob lets the flight crew members adjust the intensity of the pedestal light from the OFF to the BRT position.
In addition, when the DOME LT rotary knob is set to the STORM position, the pedestal light is set to full brightness.

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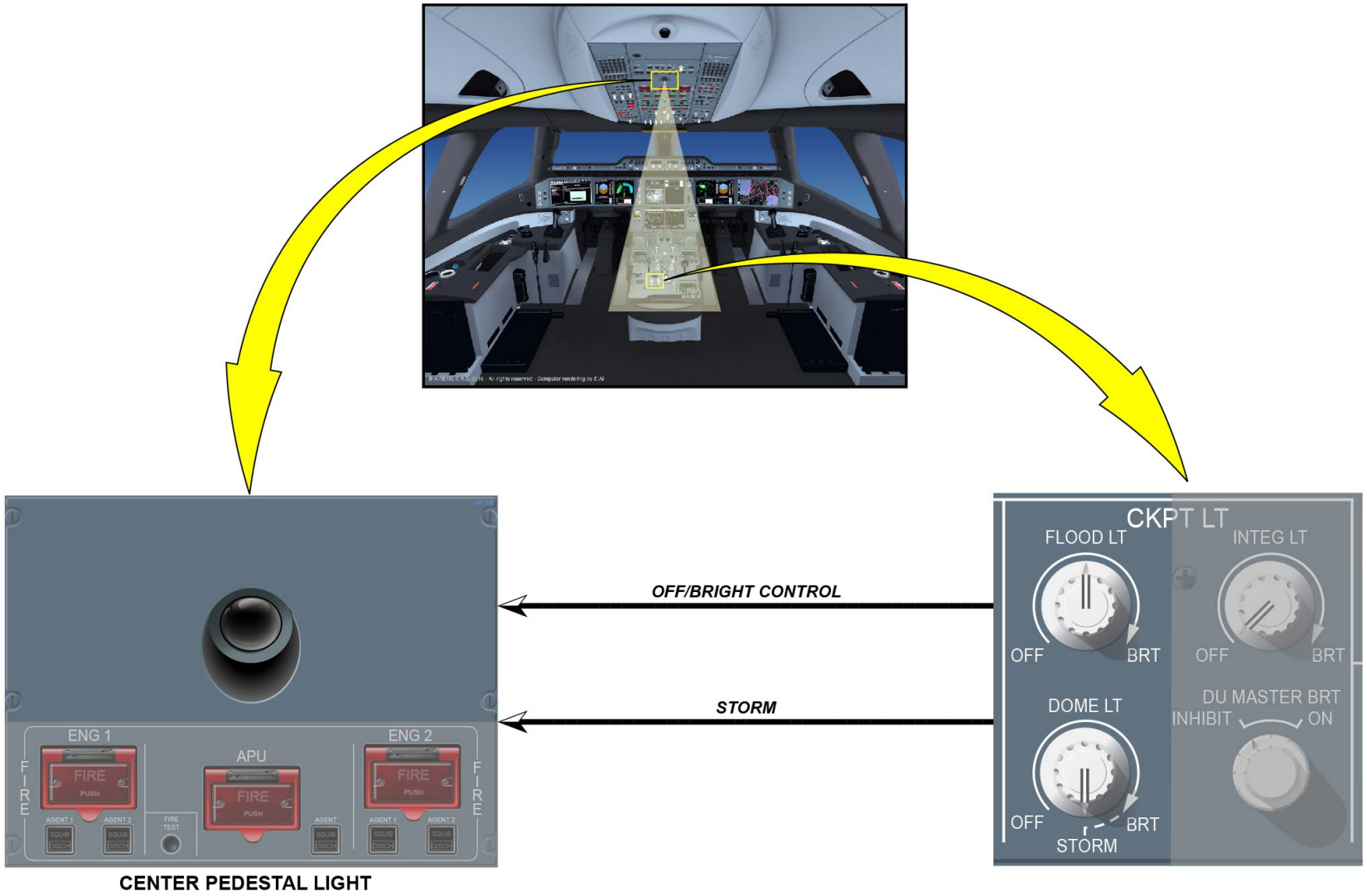


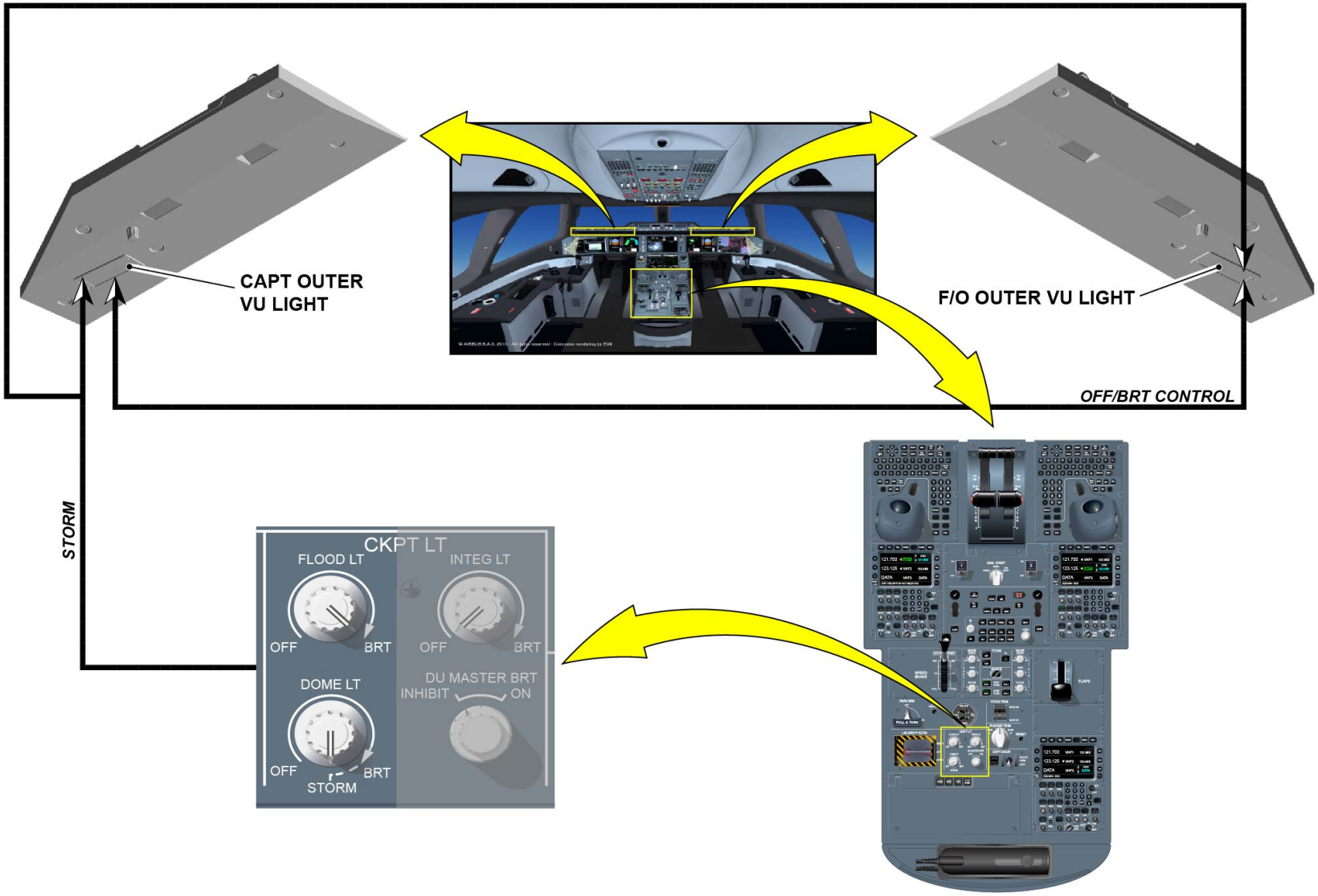
INSTRUMENT PANEL LIGHTING - PEDESTAL LIGHT

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Instrument Panel Lighting (continued)

Outer VU lights

The outer VU light gives the flight crew members a satisfactory view of the annunciator lights and controls on the CAPT and F/O outer panels.
These lights are installed below the glareshield.
On the pedestal, the FLOOD LT rotary knob lets the flight crew members adjust the intensity of the outer VU lights from the OFF to the BRT position.
In addition, when the DOME LT rotary knob is set to the STORM position, these lights are set to full brightness.



INSTRUMENT PANEL LIGHTING - OUTER VU LIGHTS

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Instrument and Panel Integrated Lighting

The instrument and panel integrated lighting lets the crew read the indications on the panels and instruments during night flights or flights in stormy weather conditions. The pilots can adjust the lighting level of all lighted panels and Liquid Crystal Display (LCD) backlighting in the cockpit through the rotary knobs.
To do this function, the system uses:
- LEDs
- Rotary knobs
- A dimming control unit.

LEDs

The LEDs are used for the integrated lighting of the cockpit panels that follow:
- Integrated Control Panels (ICPs)
- VU control panels
- Flight Control Unit (FCU)
- Lighted equipment (e.g.: Radio and Audio Management Panels (RMPs), Integrated Standby Instrument System (ISIS), etc.).

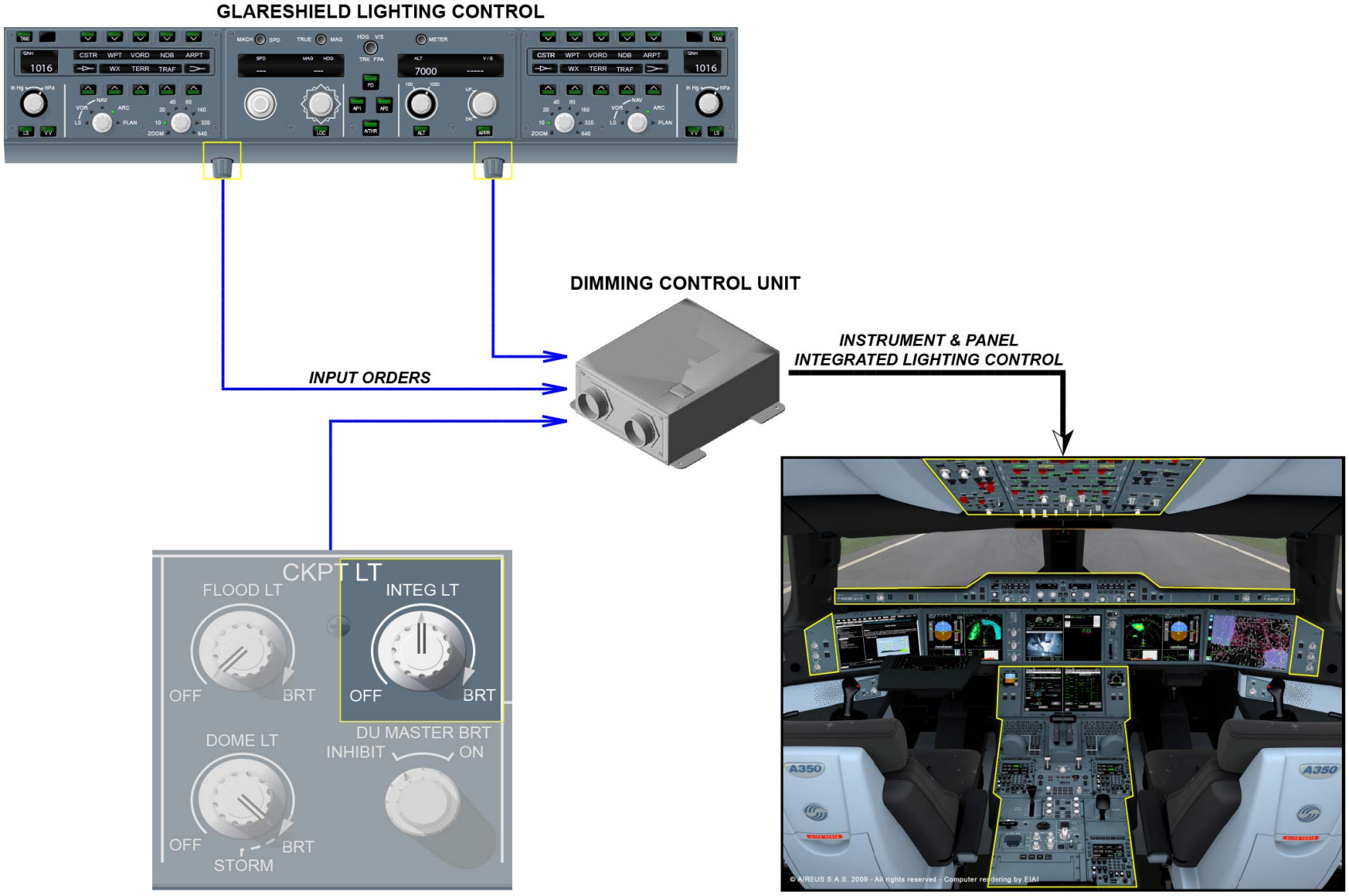
The lighted plates let the crew read the indications on the panels.

Rotary knobs

The pilots can adjust the lighting level of all the lighted panels and LCD backlighting in the cockpit from three controls:
- An INTEG LT rotary knob installed on the center pedestal, which is used to adjust the intensity of the integrated lighting for the VMs, VUs and lighted equipments.
- A right glareshield rotary knob (installed below the FCU), which is used to adjust the intensity of the FCU lighted identification-plates and the P/BSW legends on the glareshield.
- A left glareshield rotary knob (installed below the FCU), which is used to adjust the intensity of the FCU display.

Dimming Control Unit

The dimming control unit receives orders from the rotary knobs to control the integrated lighting level of the control panels and equipment.
The dimming control unit is installed in the avionics compartment under the cockpit floor.



INSTRUMENT AND PANEL INTEGRATED LIGHTING - LEDS ... DIMMING CONTROL UNIT

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Annunciator Light Test and Dimming System

The annunciator light test and dimming system controls the brightness level and does the test of all the annunciator lights installed in the cockpit.
The pilots can change the lighting level (dim or bright) of all the annunciator P/BSWs of the cockpit in the VMs, VUs and lighted equipment through the ANN LT control switch on the overhead panel.
The TEST position of the ANN LT control switch is used to do a visual check of all the annunciator lighting for correct operation. The applied illumination level is bright.
The annunciator light test and dimming system does not comport any equipment. It relies only on wiring and some relays to interconnect the ANN LT control and the various equipment or VU annunciators/pushbuttons.
The DIM/BRIGHT/TEST toggle switch is directly wired:
- Via dedicated relays, to cockpit lighted equipment, VU annunciators/pushbuttons and ICP without Controller Area Network (CAN) for the command of BRT/DIM level and test function,
- Via CAN buses to ICP equipped with CAN.

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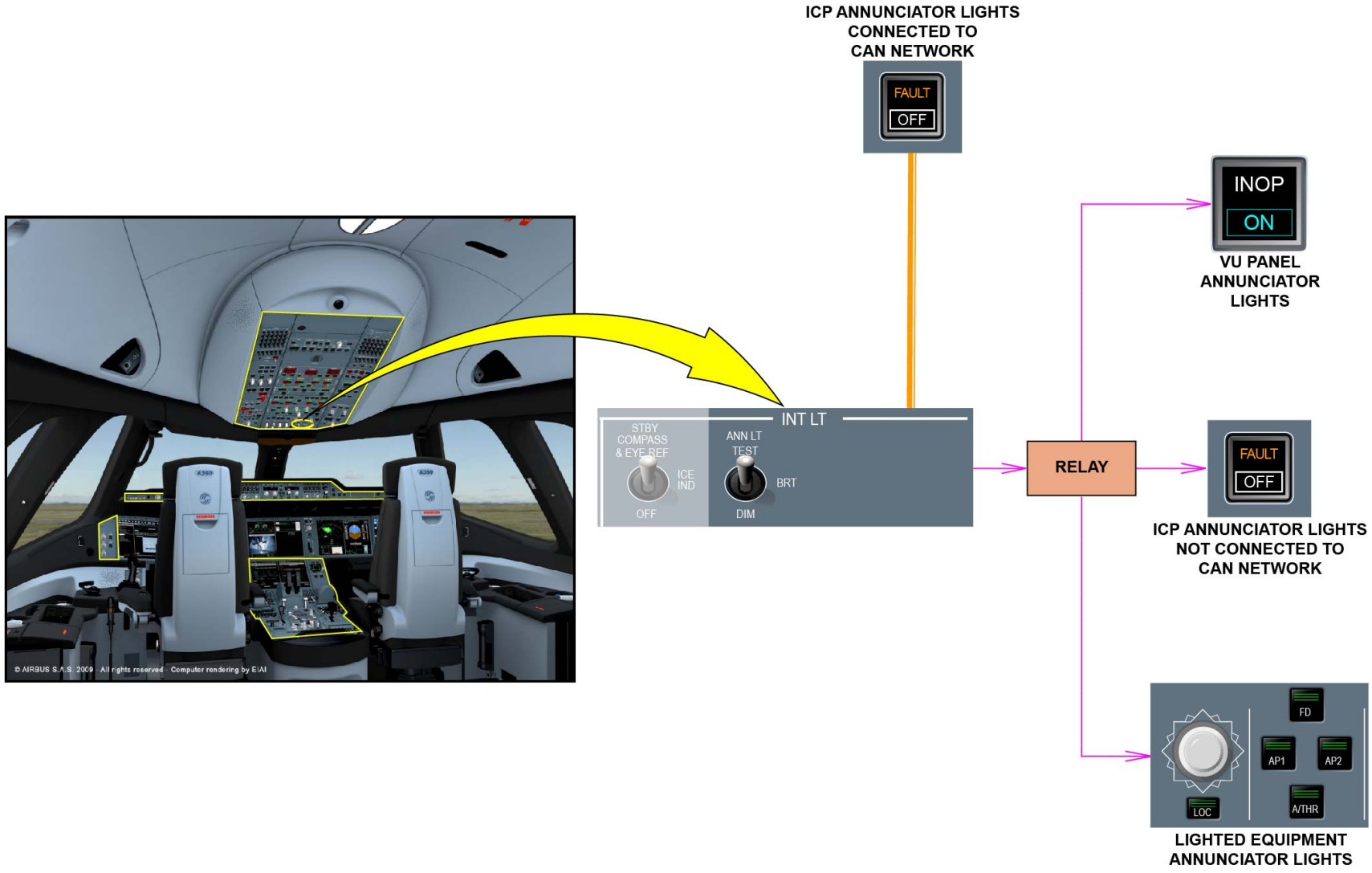


ANNUNCIATOR LIGHT TEST AND DIMMING SYSTEM

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Utility Lights

Pilot utility lights

The pilot utility lights are:
- The sliding table lights
- The map lights
- The reading lights.

Sliding table lights

The CAPT sliding-table lights are installed below the glareshield in front of the CAPT.

The F/O sliding-table lights are installed below the glareshield in front of the F/O.

The sliding table lights illuminate the keyboard and documents on the sliding table.

Two potentiometers (one for CAPT and one for F/O) adjust the intensity of the light.

Map lights

The map lights are installed in the linings of the lateral windows.

The two MAP LT rotary knobs (one for CAPT and one for F/O) let the flight crew members adjust the intensity of the lights, from the OFF to the BRT position.

The map lights are Line Replaceable Units (LRUs). They are interchangeable with Third and Fourth Occupant reading lights.

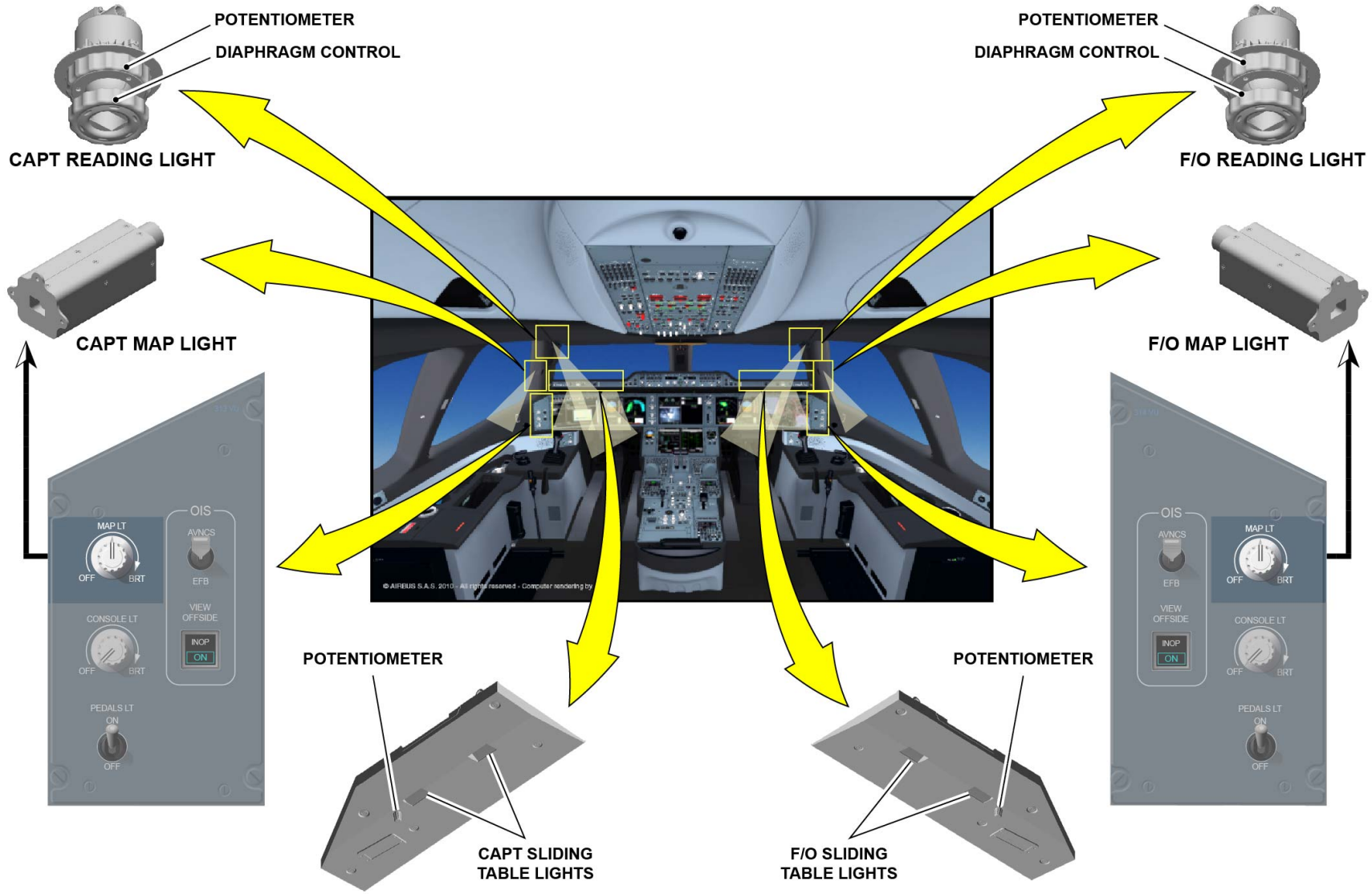
Reading lights

The CAPT and F/O reading lights are installed in the top left and right corners of the windshields.

A potentiometer (top control ring) included in each light controls the intensity of the light.

A diaphragm (bottom control ring) included in each light adjusts the beam dimension.

Note that the beam direction of the reading lights is adjustable to illuminate the lateral console, side stick area, seat positions, sliding table and a part of the pedestal.



UTILITY LIGHTS - PILOT UTILITY LIGHTS

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Utility Lights (continued)

Eye reference light

The eye reference light is installed on the central strut between the two windshields.
On the INT LT section of the overhead panel, the STBY COMPASS and EYE REF control switch controls the eye reference lighting to help the flight crew members adjust the position of their seat.

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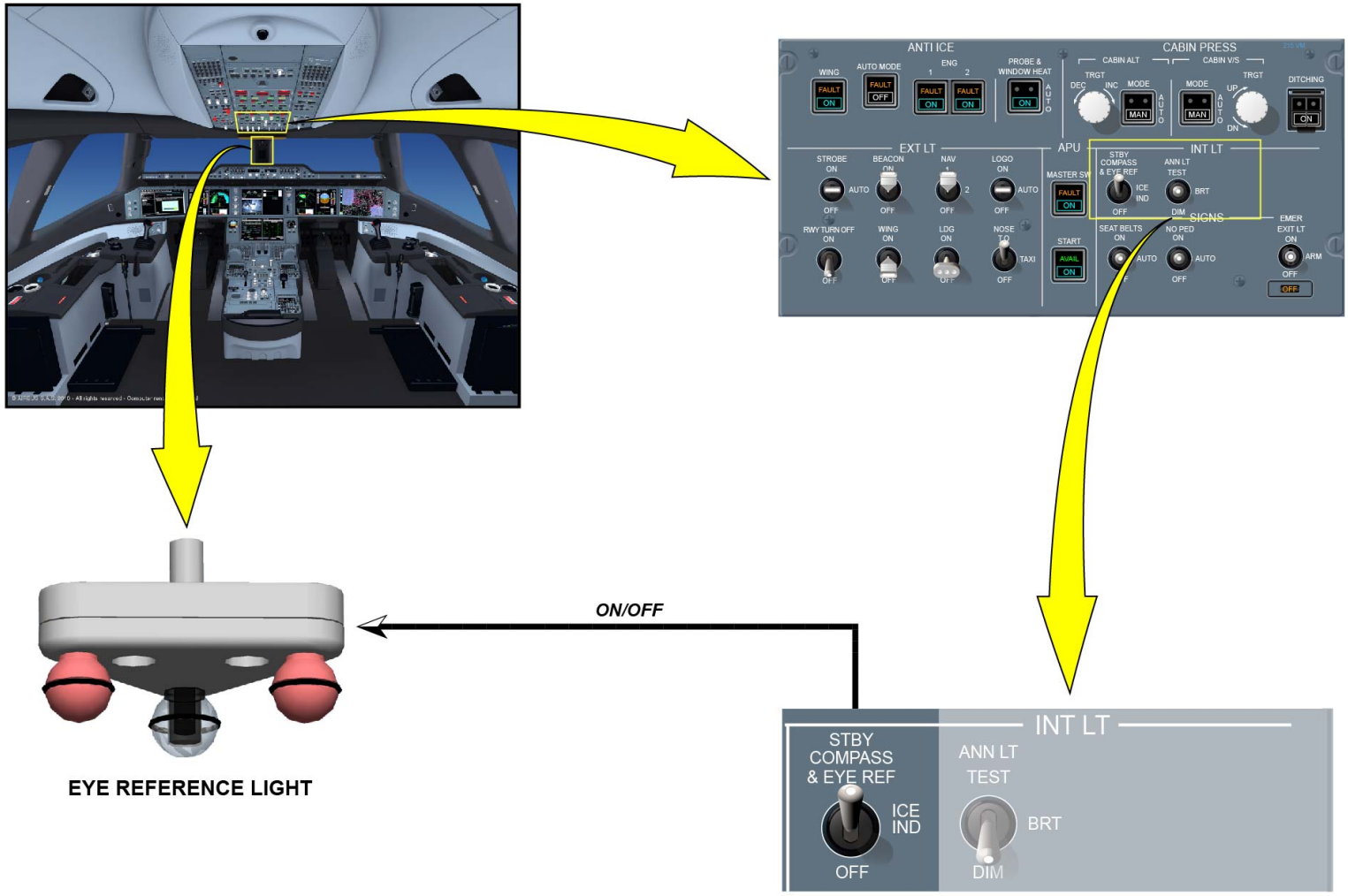

UTILITY LIGHTS - EYE REFERENCE LIGHT

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Utility Lights (continued)

Occupant utility lights

One reading light and one console light for the Third Occupant
The console light for the Third Occupant is installed in the ceiling, between the overhead panel and the dome light.
The reading light for the Third Occupant is installed in the ceiling, behind the dome light.
Two rotary knobs in the Third Occupant area are used to adjust the intensity of the lights from the OFF to the BRT position.
One reading light for the Fourth Occupant
The reading light for the Fourth Occupant is installed in the lining of the left lateral part, behind the CAPT seat.
A rotary knob in the Fourth Occupant area is used to adjust the intensity of the light from the OFF to the BRT position.

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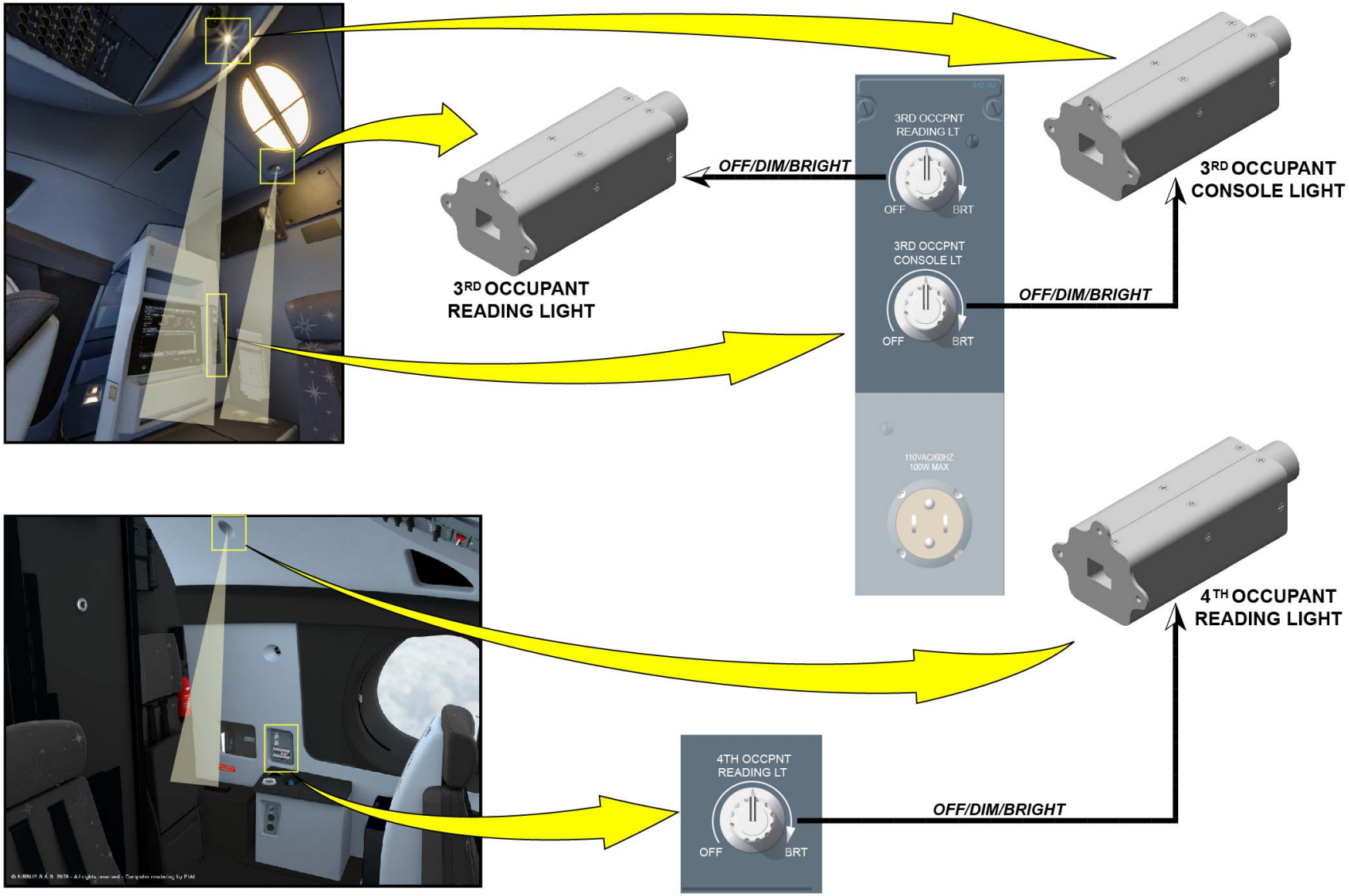


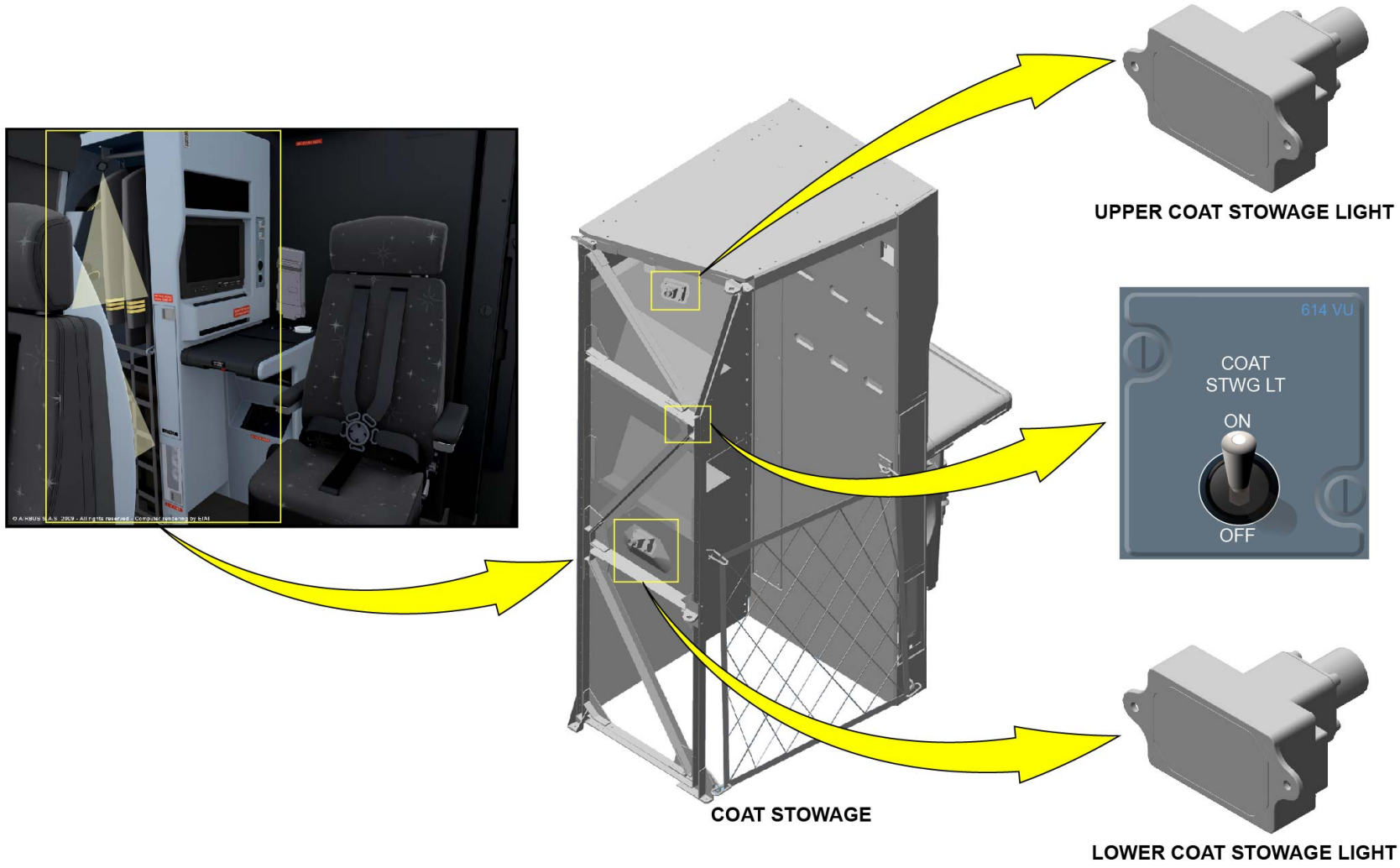
UTILITY LIGHTS - OCCUPANT UTILITY LIGHTS

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Utility Lights (continued)

Coat stowage lights

The coat stowage lights are installed in the linings of the coat stowage (one at the top and one at the bottom).
The COAT STWG LT control switch lets the flight crew members control the two lights of the coat stowage.



UTILITY LIGHTS - COAT STOWAGE LIGHTS

COCKPIT LIGHTING SYSTEM DESCRIPTION (2)

Utility Lights (continued)

Service power outlets

Two service power outlets (115VAC and 28VDC) are installed near the Fourth Occupant console. These outlets can be used for servicing tasks (to clean the cockpit by vacuum for example).

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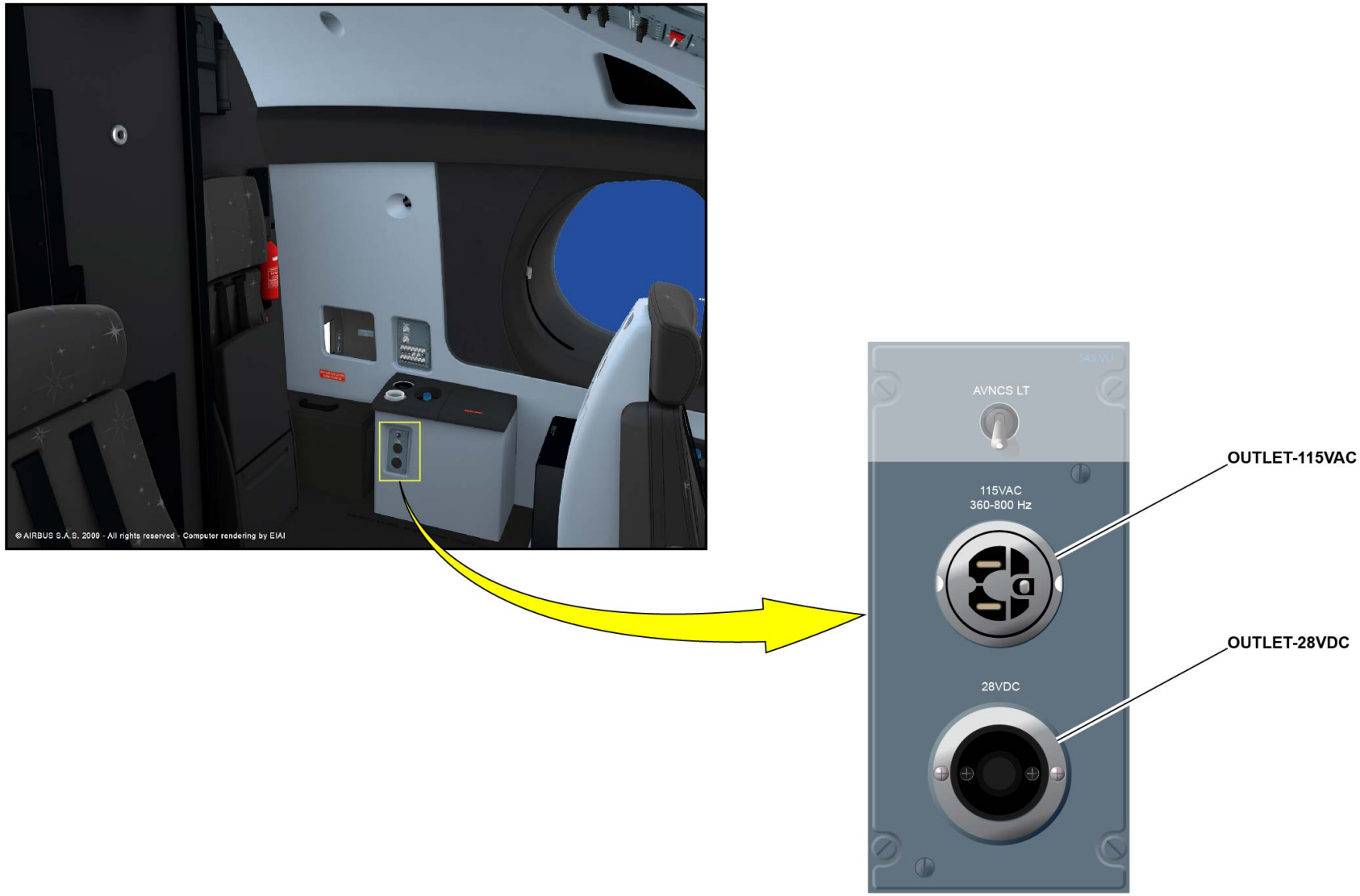


UTILITY LIGHTS - SERVICE POWER OUTLETS

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Cabin Lighting

The cabin lighting units includes:
- The ceiling light
- The sidewall light
- The ceiling recess light
- The handrail light (optional).

Note 1: all the cabin lighting elements use LED technology.
Note 2: these cabin lights supply lighting through reflection on the surfaces.

General lighting

The general illumination inside the cabin is done by the lighting units that follow:
- The ceiling light
- The sidewall light.

The ceiling lights are installed behind a cover of the lateral Overhead Stowage Compartments (OHSCs).
The sidewall lights illuminate the side of the cabin in an area which does not receive illumination from the ceiling light.
The FAP is the primary control for the general lighting through the FAP/Lights page.

Application lights

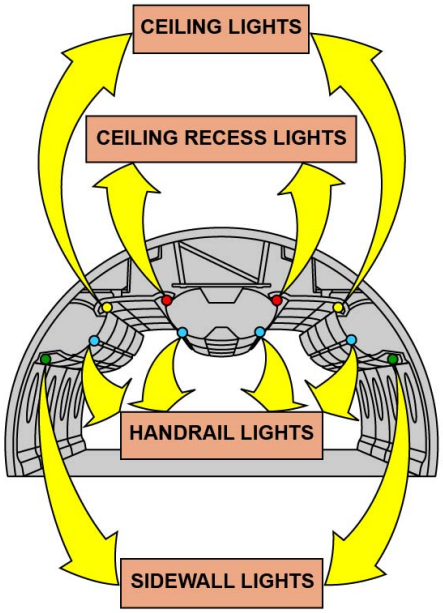
The application lights include the lighting units that follow:
- The ceiling recess light
- The handrail light.

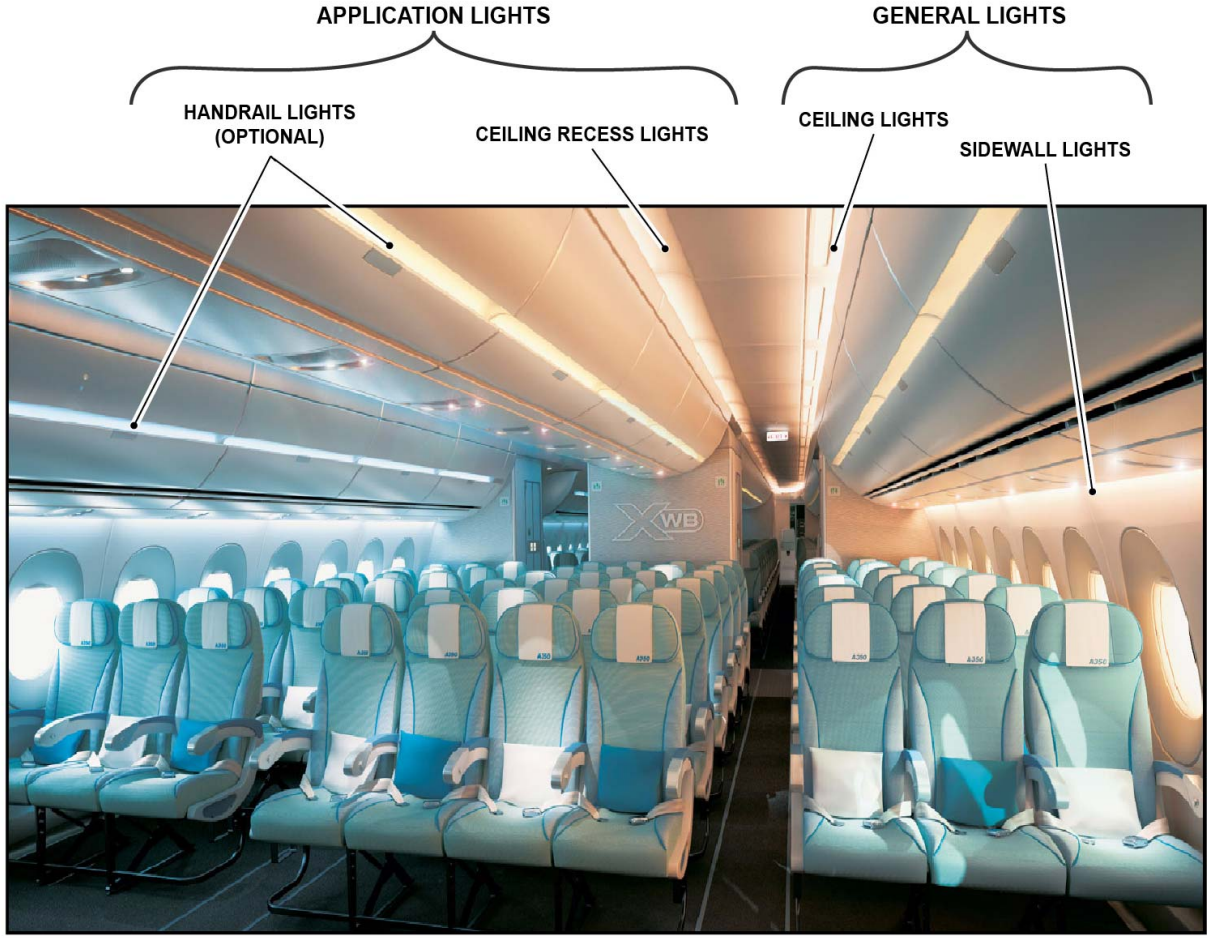
The application lights are used to highlight and accentuate the different areas of the cabin and to underline the interior design.
The ceiling recess lights are installed above the center OHSCs to illuminate the recess of the ceiling.

The optional handrail lights are installed on the grip rails of the center and lateral OHSCs. They illuminate the grip rails of the OHSCs and the seat row numbering.
Note that the FAP is the primary control for the application lights through the FAP/Lights page.

CONTROL AND MONITORING

FAP LIGHTS PAGE





ALL THE CABIN LIGHTING ELEMENTS USE LED TECHNOLOGY

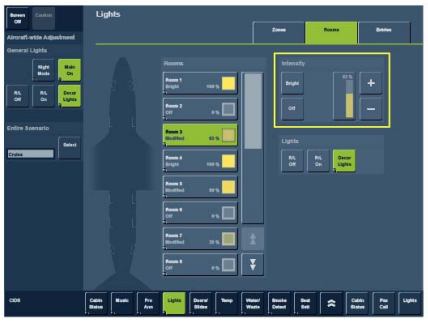
CABIN LIGHTING - GENERAL LIGHTING & APPLICATION LIGHTS

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

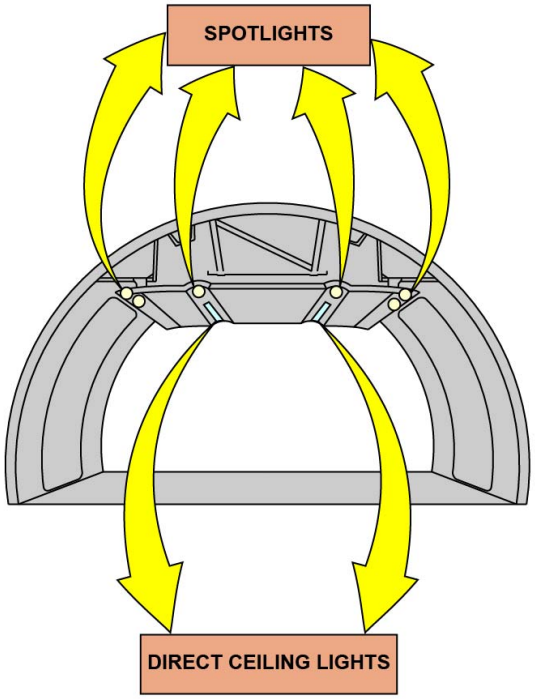
Entrance Areas

The spotlights illuminate the entrance areas and the cross aisle. The primary control of the spotlights is done through FAPs (and optionally the Additional Attendant Panels (AAP)).
Note that most of the spotlights contain a separate emergency light.
An optional dome light can be installed at door 2 area.
Note that the dome light is part of the application lights.
The direct ceiling lights illuminate the entrance areas at door 1 and 4.

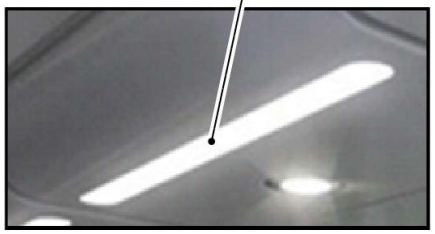
CONTROL AND MONITORING



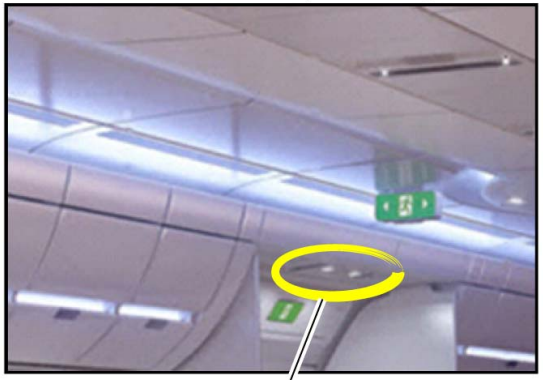
FAP LIGHTS PAGE



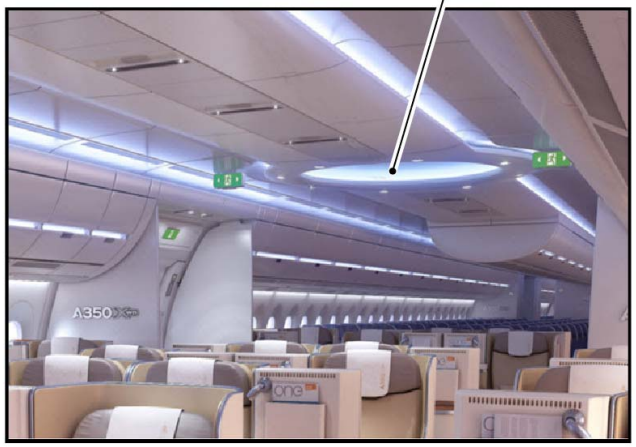
DIRECT CEILING LIGHT



ENTRANCE AREA (EXAMPLE)



DOME LIGHT IN DOOR 2
(OPTIONAL)



ENTRANCE AREAS

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Passengers and Attendant Lights

The passenger LED reading lights on the Passenger Service Unit (PSU) can be set to the on or off position individually from:
- The related P/BSW on the PSU
- The P/BSW on Passenger Control Unit (PCU), installed on the passenger seat, through the IFE system.

In addition, the R/L On and R/L Off control keys on the FAP/Lights page set all the passenger LED reading lights to the on or off position (on ground only).

The attendant work lights are installed in the attendant seat areas and in special working areas. The related P/BSW sets its attendant work light to the on or off position.

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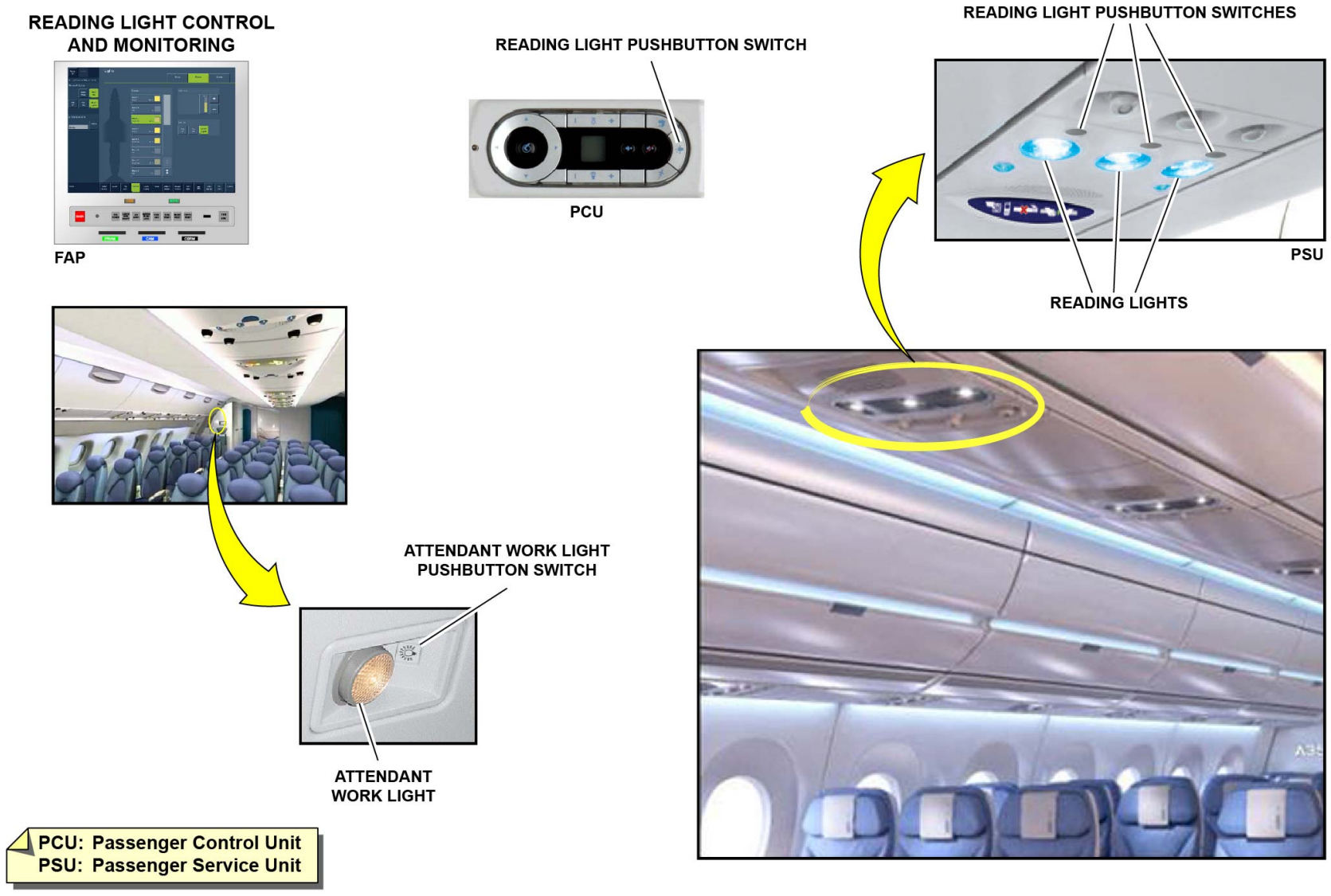

PASSENGERS AND ATTENDANT LIGHTS

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Standalone Signs

There are different standalone lighted signs:
- The No Smoking (NS) signs
- The Fasten Seat Belts (FSB) signs
- The Return to Seat (RTS) signs
- The lavatory occupied signs
- The no Portable Electronic Devices (PEDs) signs (optional).

There is a vacant and an occupied indicator in the cockpit, for the lavatory of the left door 1 area.
The NS, FSB and RTS standalone signs (with LED lights) can be set:
- Manually in the cockpit with the related toggle switch (on the SIGNS panel)
- Automatically in relation to the A/C configuration.

The standalone lighted signs are located where the passengers can easily see them. They give important instructions to the passengers.
- The NS sign is used to tell the passengers not to smoke.
- The FSB sign is used to tell the passengers to fasten their seat belt.
- The RTS sign is used to tell the passengers to return to their seat.
- The lavatory occupied signs are used to show whether the lavatories are occupied or not. The lavatory door switches control the lavatory occupied signs which are self dimmable.
- The no PEDs sign (optional) is used to tell the passengers to stop their personal electronic devices.

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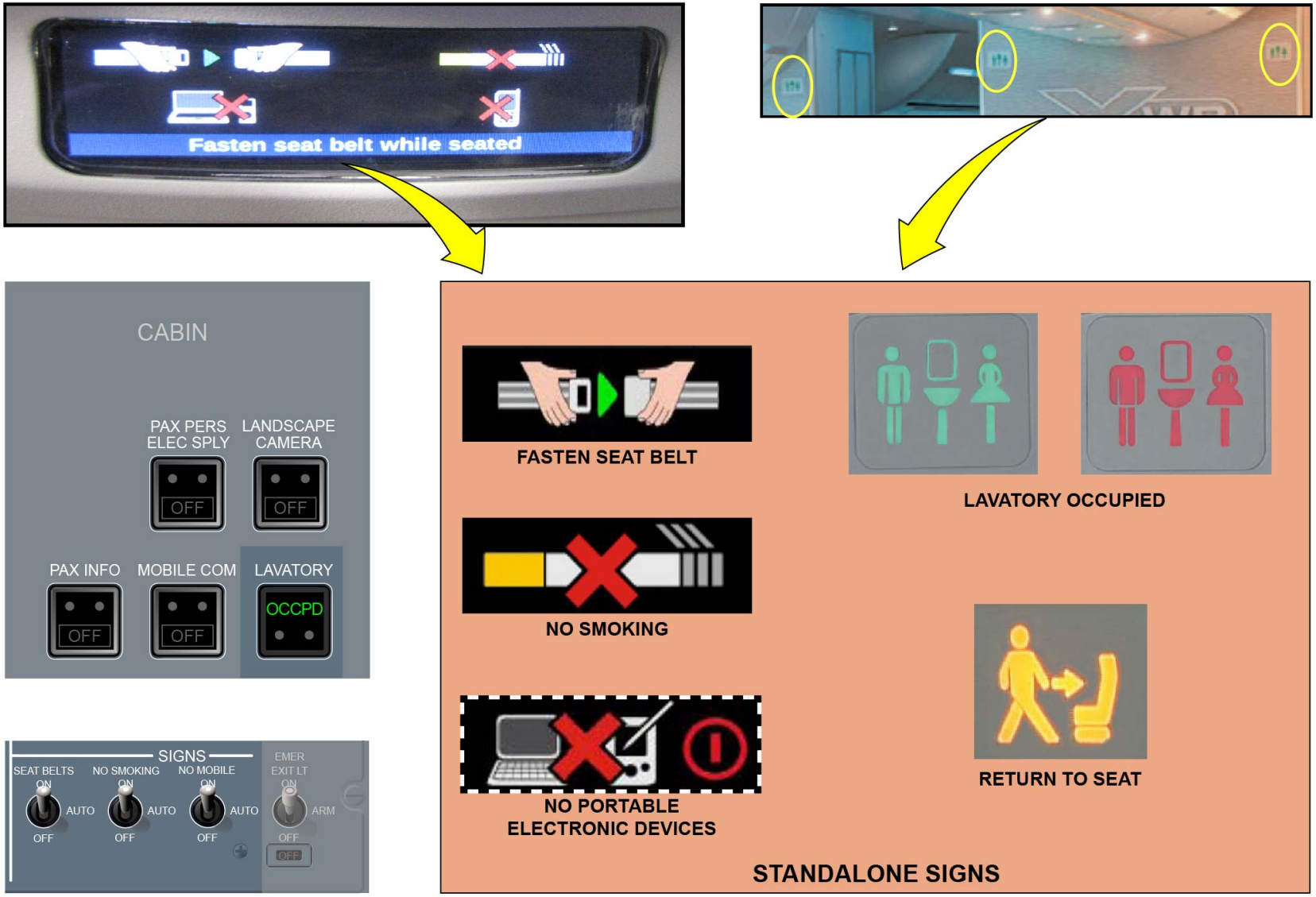


STANDALONE SIGNS

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Lavatory Lighting

The lavatory lighting illuminates the lavatory compartment through:
- The ceiling LED lights
- The mirror LED lights
- The washtable LED lights.

The lavatory lighting can be controlled from:
- The FAPs and optionally the AAPs
- The door lock mechanism which has three lock positions to set the related light in the lavatory.

CONTROL AND MONITORING

LAVATORY LIGHTING

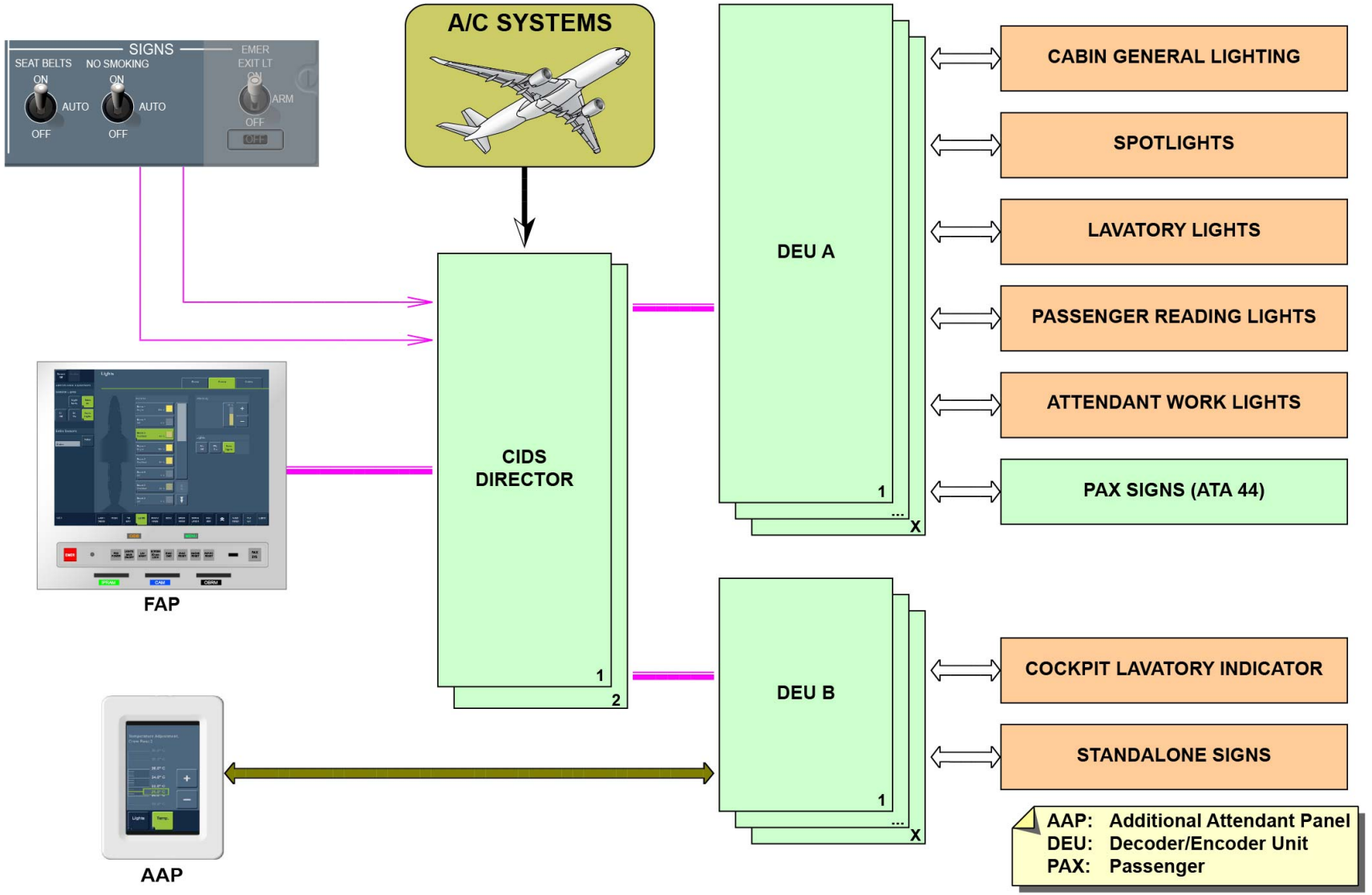
CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Architecture and Interfaces

The CIDS directors control and monitor the cabin lighting system through the Decoder/Encoder Units (DEUs) type A and B.
The cabin crew has access to the lighting functions through the FAPs.
There are also optional AAPs to set lights from specific areas.
To control the lights, the DEUs receive data from:
- The position of the NO SMOKING and SEAT BELTS switches installed on the SIGNS panel of the Integrated Control Panel (ICP), in the cockpit
- The A/C systems that send messages to the CIDS (A/C on ground, engines in operation, etc.).

The lighting elements that follow are connected to DEUs A:
- The cabin general lighting
- The cabin application lights
- The spotlights
- The lavatory lights
- The passenger reading lights
- The attendant work lights
- The standalone signs
- The passenger signs (ATA 44).

The vacant or occupied indicator (installed in the cockpit, for the lavatory from the area of left door 1) and the standalone signs are connected to the DEU B.



ARCHITECTURE AND INTERFACES

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Cabin-Lighting Component Description

The general illumination contains:
- The cabin deck lighting, which includes:
- The cabin general lighting: ceiling lights, sidewall lights, direct ceiling lights and spotlights.
- The application lights: ceiling recess lights, optional handrail lights and dome light.

In normal operation, the illumination devices illuminate the cabin at necessary intensity in all flight phases (during boarding, taxiing and also for cleaning and maintenance operations).
The FAPs (and optionally the AAPs) control the cabin general illumination through the CIDS directors and DEUs A.
The Secondary Power Distribution Boxes (SPDBs) supply the cabin general lighting with 115VAC.
The illumination devices can supply a wide range of light intensity and colors.
It is possible to change the cabin general lighting through different scenarios. This can be done from the FAP/Lights page through the selection of scenarios with the Select key.
The components of the cabin general lighting are the primary light sources for the lighting scenarios.

Cabin general lighting

The cabin general lighting includes:
- The sidewall lights
- The ceiling lights
- The direct ceiling lights.

The sidewall lights and ceiling lights are made of light devices. Each light device includes:
- An internal light adapter
- A light module.

The direct ceiling lights are made of light modules that are connected a remote light adapter.
Each light module is made of red, green, blue and white LED modules.
The light adapters include the internal power supply of the light device. It converts 115VAC received from SPDB into 28VDC necessary to supply the LED module. The light adapters digitally control the brightness (from 0 to 100%) and color of the LED module through the order sent by the CIDS through the DEUs A.
All the cabin general light devices can have different sizes in relation to the cabin layout.

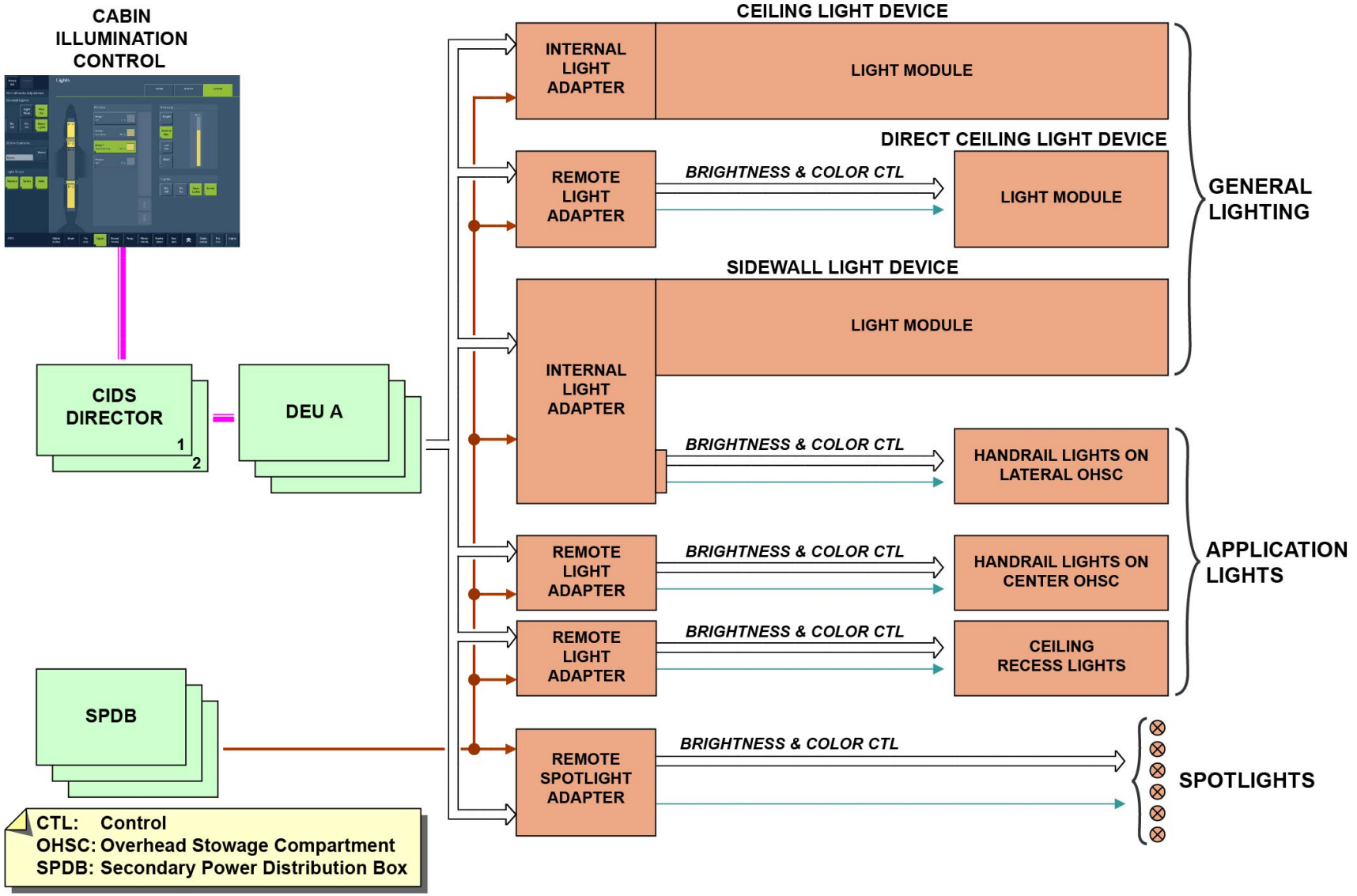
Application lights

The ceiling recess lights and the handrail lights are made of red, green, blue and white LED modules. They are connected to the remote light adapters.
The handrail lights on the center OHSCs and the ceiling recess lights have their own remote light adapters.
The light adapter of the sidewall lights has an external connector which is used to remotely supply and control the handrail lights installed on the lateral OHSCs.
The remote light adapters supply power to the light device. It converts 115VAC received from SPDB into 28VDC necessary to supply the LED module. They digitally control the brightness (from 0 to 100%) and color of the LED module through the order sent by the CIDS through DEUs A.
The application light devices can have different sizes in relation to the cabin layout.

Spotlights

The spotlights are red, green, blue and white LED devices. They are connected to a remote spotlight adapter. The spotlight adapter digitally controls the brightness and color (from 0 to 100%) of the spotlights through the order sent by the CIDS through DEUs A. They also include

an internal power supply that converts 115VAC received from SPDB into 28VDC necessary to supply the LED modules.
In normal operation, the spotlights illuminate special areas at necessary intensity in all flight phases (during boarding, taxiing and also for cleaning and maintenance operations).
The number and the position of these spotlights change with the customer cabin layout.
The FAPs (and optionally the AAPs) control the spotlights through the CIDS directors and DEUs A. The light intensity of the spotlights is adjustable from 100% to 0%. The spotlights are part of the lighting scenarios set for a related compartment (e.g. the entrance area).
Each spotlight adapter has connections with a maximum of six spotlights. The spotlight adapter is in the location area adjacent to its related spotlights.
The direct ceiling light and optional dome light contain red, green, blue and white LED devices and operate with a sufficient number of remote power supply modules. They are controlled by the CIDS and supplied by the SPDB 115VAC.



CABIN-LIGHTING COMPONENT DESCRIPTION - CABIN GENERAL LIGHTING ... SPOTLIGHTS

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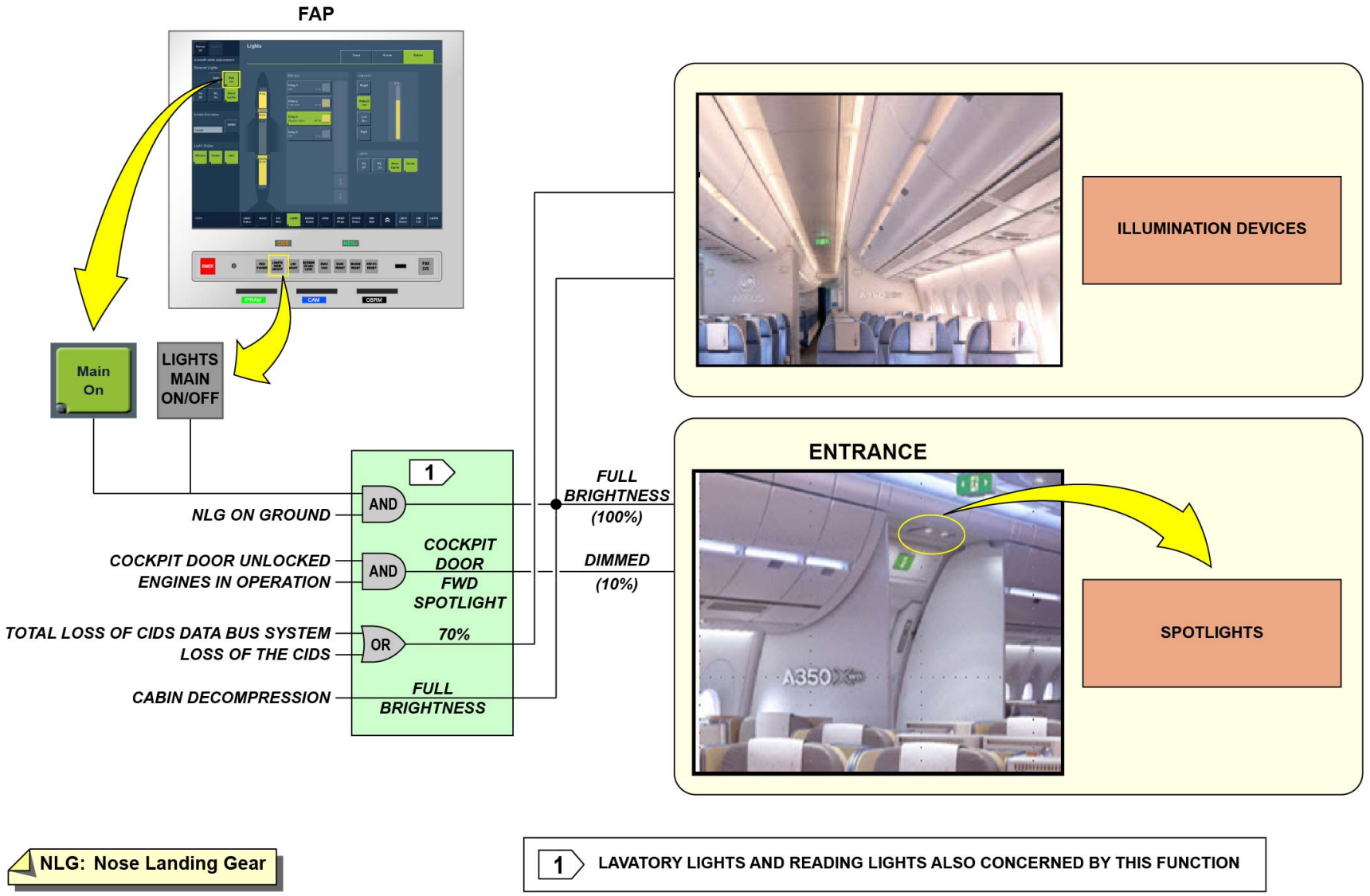
CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Cabin-Lighting Component Description (continued)

Functional logic

A main on and off function is available from a key on the FAP/Lights page and a key on the FAP hard-key panel. The General Lights/Main On key is available only on ground (LGERS signal). It is used to set all the lights of the cabin illumination (main cabin lights, spotlights, application lights, lavatory lights and reading lights) to the on or off position, specially for maintenance and servicing purposes.
The intensity of the lights from the cabin general lighting (ceiling lights, sidewall lights, ceiling recess lights and spotlights) is automatically dimmed (70%) in these conditions:
- Total loss of the CIDS data bus (buses between the directors and DEUs A)
- Loss of the CIDS (loss of directors for example).

If a cabin decompression occurs, the general illumination gives full brightness automatically.
If the engines operate and the cockpit door is unlocked, the intensity of the spotlight in front of the cockpit door decreases automatically (at 10%).
These above functional logics operate independently from all light settings and light scenarios available in the cabin.



CABIN-LIGHTING COMPONENT DESCRIPTION - FUNCTIONAL LOGIC

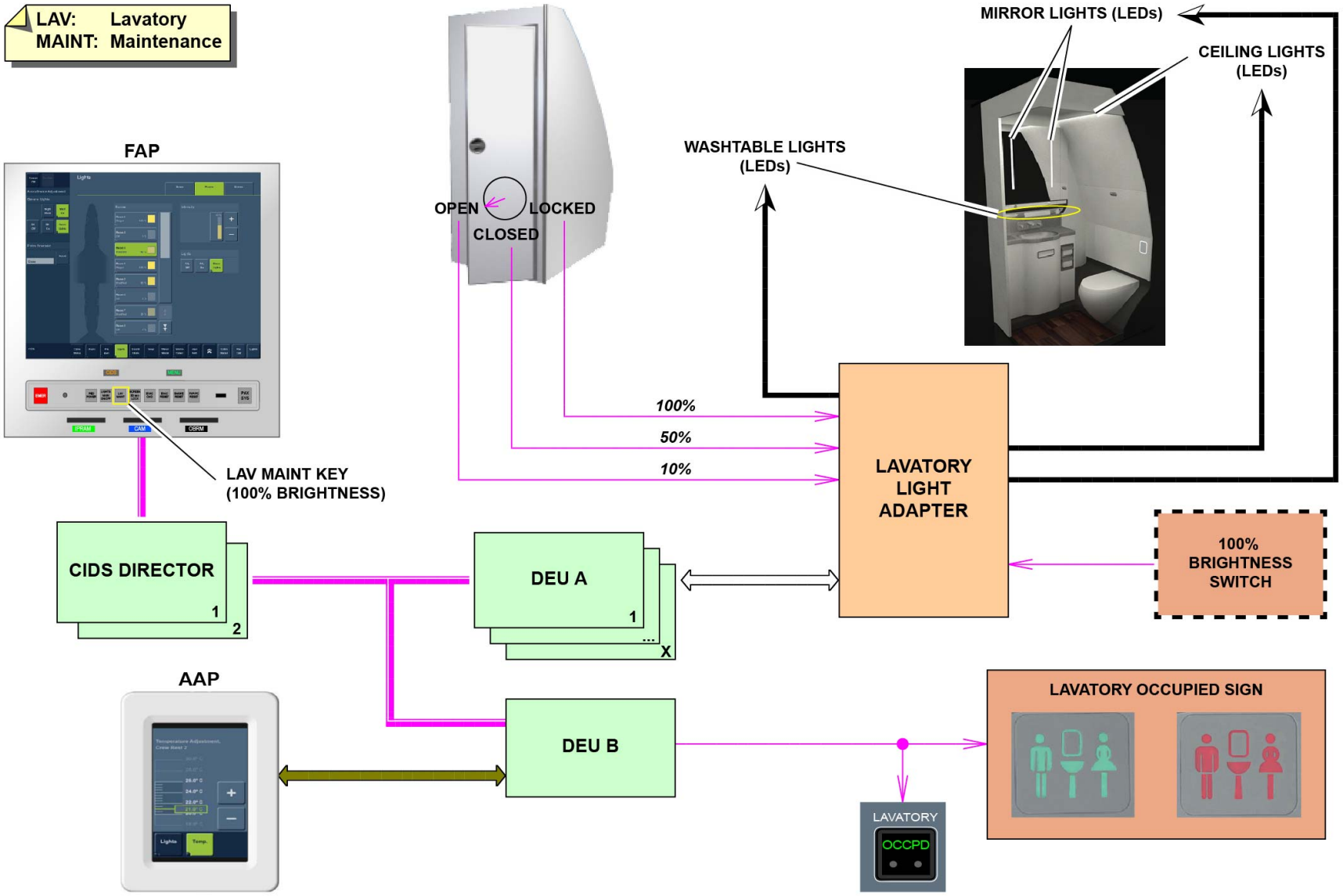
CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Lavatory Lighting Architecture and Interface

The lavatory lighting includes:
- The ceiling lights (LEDs)
- The mirror lights (LEDs)
- The washtable lights (LEDs).

The lavatory lighting illuminates the lavatory compartment at a specified intensity related to the lavatory door status (open, closed or locked).
The door lock-mechanism has three lock positions to set the related lights in the lavatory to:
- 10% brightness when the lavatory door is open
- 50% brightness when the lavatory door is closed
- 100% brightness when the lavatory door is locked.

To control the lavatory lighting, there is one lavatory light adapter in each lavatory.
The door lock-mechanism status is directly sent to a lavatory light adapter, which controls the lavatory lighting to the necessary level.
These lavatory light adapters supply the lavatory lighting with electrical power.
The CIDS director also receives the door lock-mechanism status from the lavatory light adapter and through the DEU A. This director controls the lavatory occupied signs by this data through the DEU B.
The FAP (and optionally the AAPs) can control the lavatory lighting through the CIDS directors and DEUs A.
The General Lights/Main On key (available on ground) is used to set the lavatory lighting to the on or off position. It is possible to set the light to 100% for cleaning and maintenance from the LAV MAINT key on the FAP.
With an optional 100% brightness switch installed in the toilets, it is possible to illuminate a single lavatory (e.g. for handicapped passengers).



LAVATORY LIGHTING ARCHITECTURE AND INTERFACE

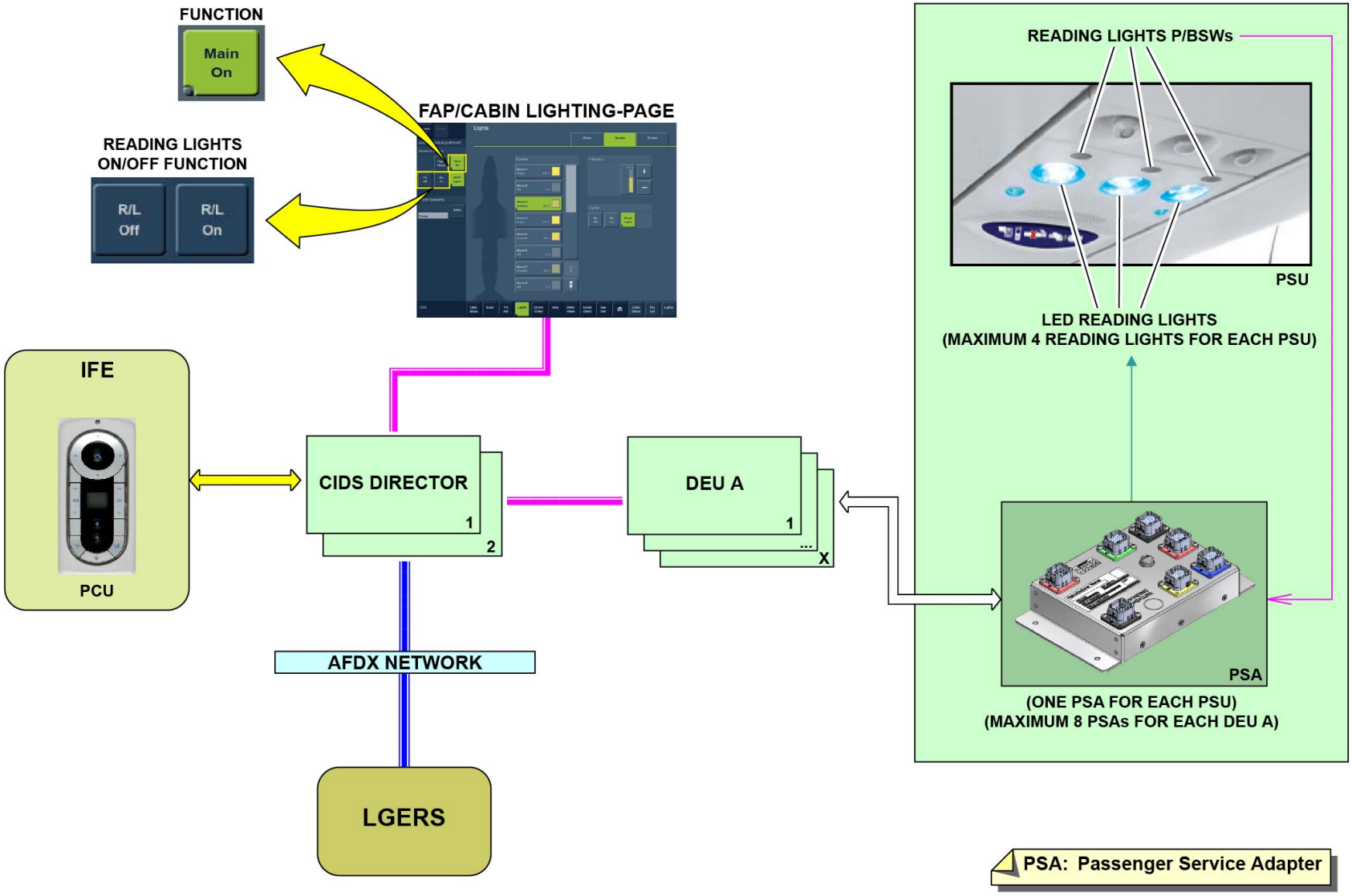
CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

Reading Lights Architecture and Interface

The reading lights include:
- The passenger reading lights
- The attendant work lights.

Passenger reading lights

The passenger LED reading-lights are installed in the PSUs.
The light intensity and the electrical supply of the reading light is directly controlled by the Passenger Service Adapter (PSA). The PSA is a component installed in the PSU. There is one PSA for each PSU. These PSAs have also a direct connection to the DEUs A to control the reading lights from the FAPs or AAPs (optional).
Each passenger can control its reading light from a P/BSW on the PSU. From the individually PCU on the seat armrest (IFE system), another P/BSW controls the passenger reading light individually through the CIDS directors, DEUs A and PSAs.
The FAPs (and the optional AAPs) can also control the reading lights through the CIDS directors and DEUs A. The R/L On and R/L Off keys of the FAPs (and the optional AAPs) can set all the reading lights to the ON or OFF position. This function is only available when the A/C is on ground (LGERS signal).
If these functions are configured in the Cabin Assignment Module (CAM):
- All the reading lights go off when the Main On key of the FAP/Lights page is in the off position (on ground only).
- The FAPs (in all flight phases) can control each reading light individually.
- All the reading lights are part of the dimming or a scenario function of the cabin general lighting.



READING LIGHTS ARCHITECTURE AND INTERFACE - PASSENGER READING LIGHTS

V1813401 - V01T0M0 - VM33D2CABIN3001

CABIN LIGHTING SYSTEM DESCRIPTION (2/3)

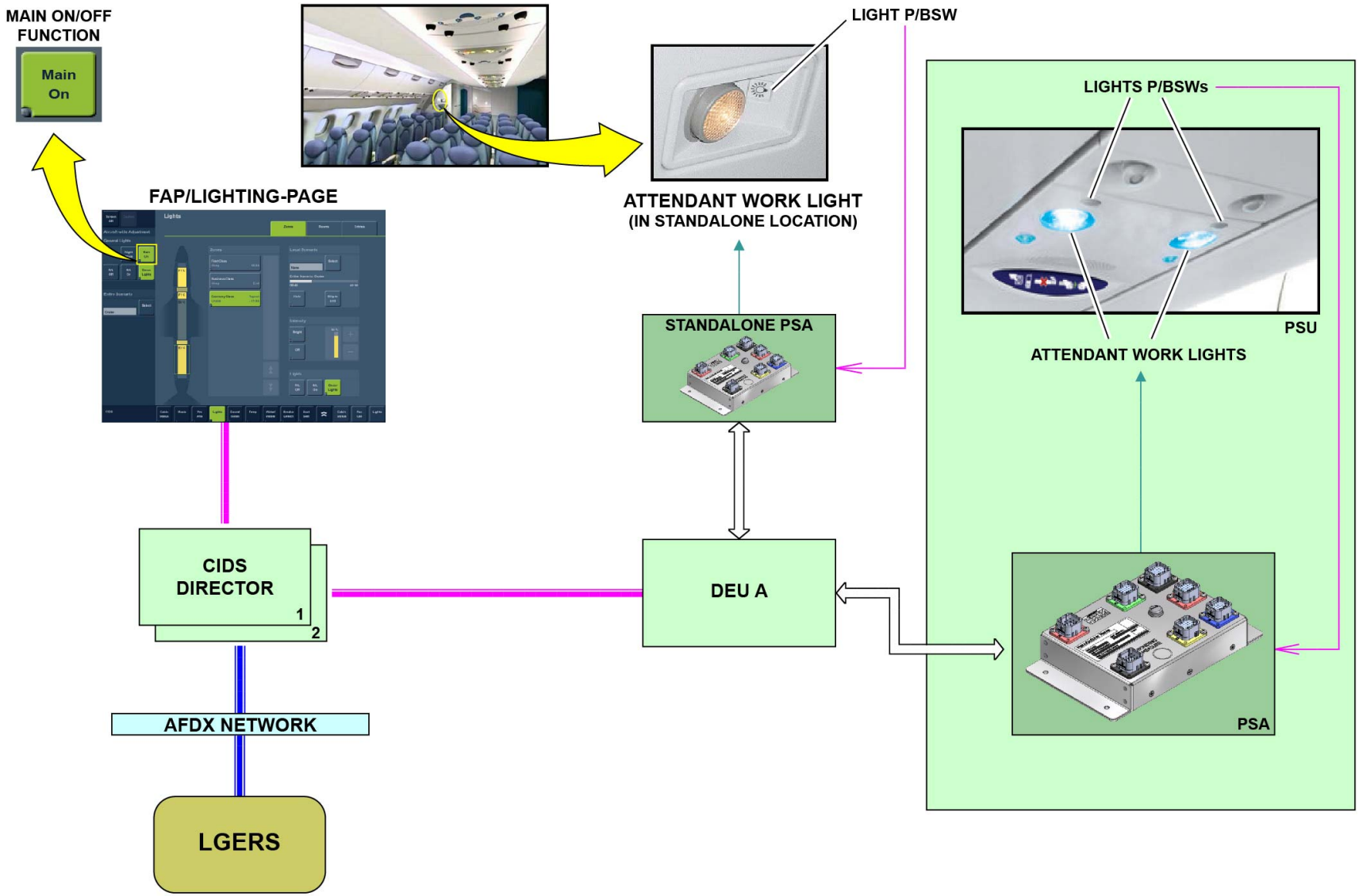
Reading Lights Architecture and Interface (continued)

Attendant work lights

The attendant work lights can illuminate the attendant working areas and the attendant seats during all flight phases.
The light P/BSW from the area of each attendant work light switches on and off the related attendant work light.
The attendant work lights receive electrical power through:
- The PSA, when the PSU controls the light (above the attendant seat)
- The standalone PSA, when there is no PSU.

In each configuration, these adapters have a connection to DEUs A to control the reading lights from FAPs or AAPs. The intensity and the electrical supply of the reading lights are controlled by the PSA.
If CAM has a special configuration, all the attendant work lights can be controlled through the LIGHTS MAIN ON/OFF key on the FAP, only if the A/C is on ground (LGERS signal).

V1813401 - V01T0M0 - VM33D2CABIN3001



READING LIGHTS ARCHITECTURE AND INTERFACE - ATTENDANT WORK LIGHTS

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

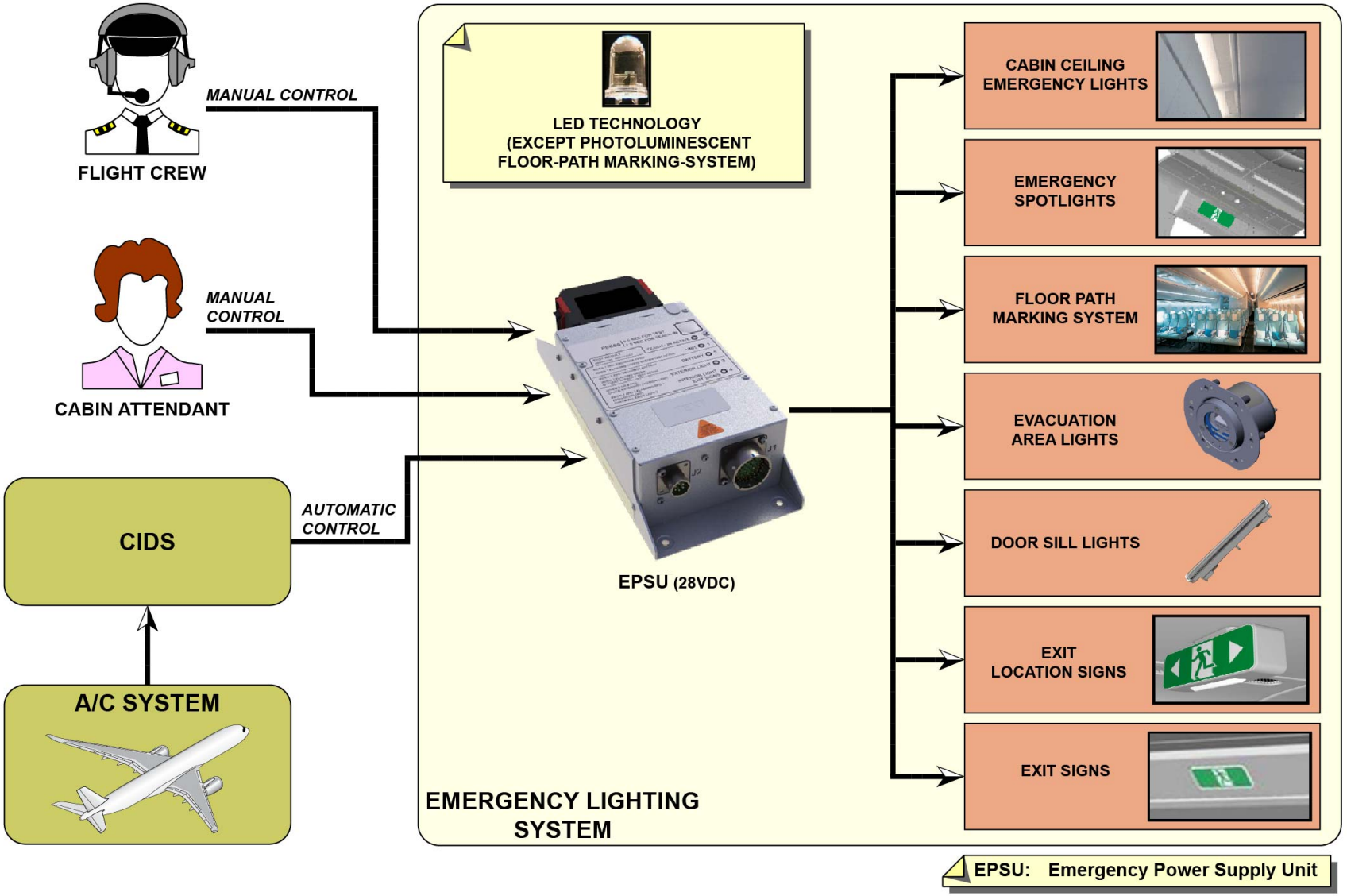
General

In Emergency (EMER) conditions, the EMER lighting system gives sufficient lighting to the cabin:
- To identify the emergency exit areas (doors and slides)
- To do a safe and quick evacuation of the A/C.

The emergency lighting system must be satisfactory in darkness and/or if there is smoke in the cabin, even if no A/C power supply is available.
The Emergency Power-Supply Units (EPSUs) are the heart of the emergency lighting system.
They have interfaces with the cockpit crew, cabin crew, CIDS and some A/C systems for control purposes.
The EPSUs are directly connected to the emergency lights system to supply it with 28VDC when necessary.
If there is a total loss of A/C electrical power, EPSUs supply the emergency lights from their battery packs for a minimum of ten minutes.
The emergency lights include:
- The cabin-ceiling emergency lights
- The emergency spotlights
- The floor-path marking system
- The emergency-door sill lights
- The exit signs
- The Evacuation (EVAC) area lights.

Note: all the emergency lights use LED technology, but not the photoluminescent floor-path marking-system, which does not use it.

V1813401 - V01T0M0 - VM33D3EMERL3001


FLIGHT CREW
MANUAL CONTROL
CABIN ATTENDANT
MANUAL CONTROL
CIDS
AUTOMATIC CONTROL
A/C SYSTEM
LED TECHNOLOGY
(EXCEPT PHOTOLUMINESCENT
FLOOR-PATH MARKING-SYSTEM)
EPSU (28VDC)
CABIN CEILING EMERGENCY LIGHTS
EMERGENCY SPOTLIGHTS
FLOOR PATH MARKING SYSTEM
EVACUATION AREA LIGHTS
DOOR SILL LIGHTS
EXIT LOCATION SIGNS
EXIT SIGNS
EMERGENCY LIGHTING SYSTEM
EPSU: Emergency Power Supply Unit

GENERAL

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Emergency-Lighting Control Description

The EMER lighting system can be controlled manually:
- Through the cockpit, by the EMER EXIT LT toggle switch
- Through the cabin, by the EMER key on the FAPs.

In the cockpit, on the SIGNS panel, the EMER EXIT LT toggle switch has three positions:
- The ON position, which switches on manually the emergency lighting system.
- The OFF position, which switches off the emergency lighting system. This is the normal position on ground.
- The ARM position, which arms the emergency lighting system and switches on automatically in relation to some A/C configurations.

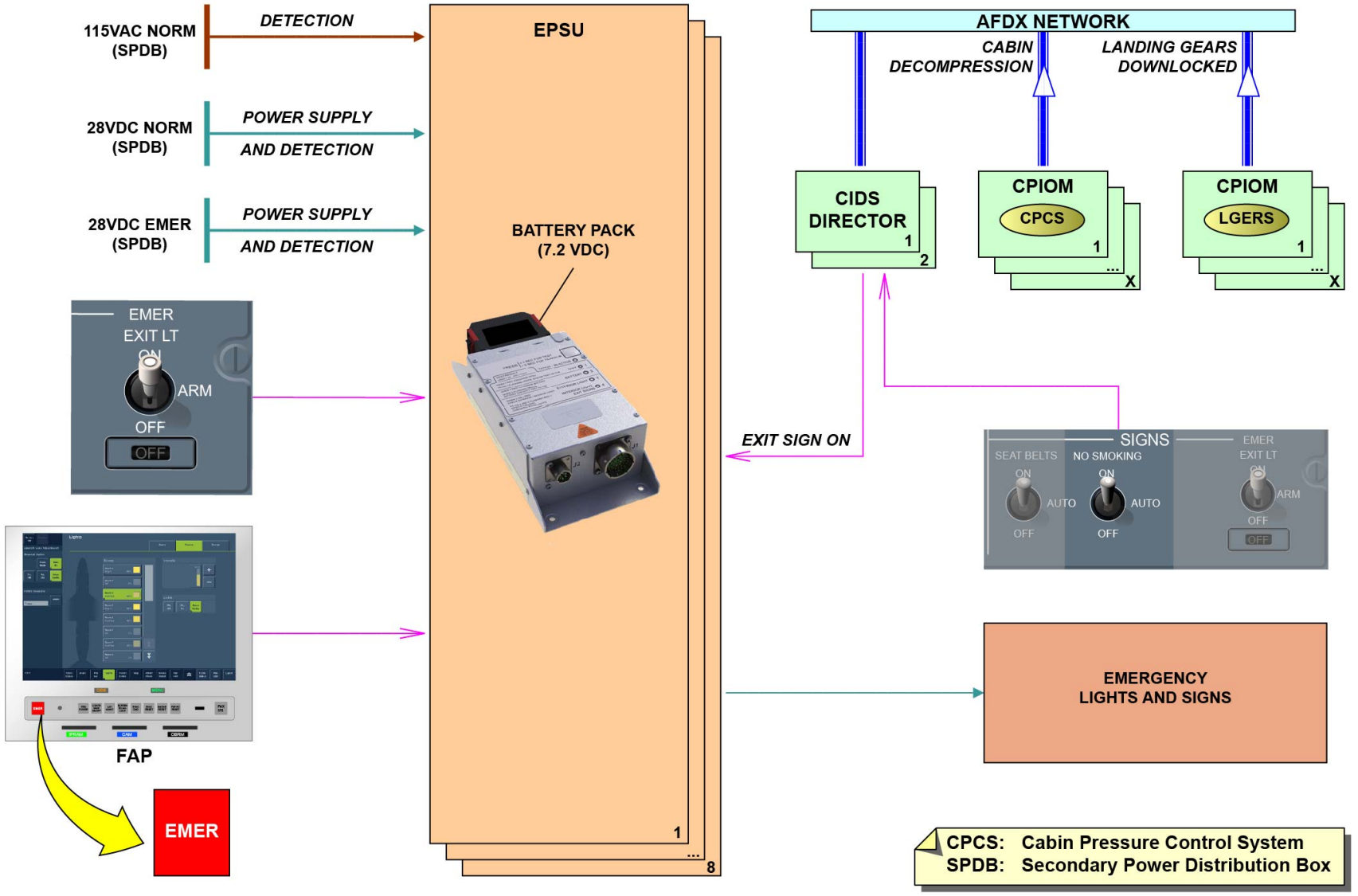
When the ARM position is selected, the emergency lighting system is started automatically in relation to the configuration of some A/C systems like:
- The total or partial loss of 28VDC (Normal (NORM) or EMER) and 115VAC NORM.
- The LGERS, which sends a signal related to the landing gear status (extended or retracted) through the CIDS directors (signal used for automatic activation of exit signs).
- The NO SMOKING switch on cockpit SIGNS panel, which sends a signal in relation to its position through the CIDS directors (signal used for automatic activation of exit signs).
- The Cabin Pressure Control System (CPCS), which sends a signal related to a cabin rapid decompression through the CIDS directors (signal used for automatic activation of the exit signs).

The 28VDC NORM (from SPDBs) or 28VDC EMER (from Electrical Power Distribution Centers (EPDCs)) always supplies the emergency lighting system with 28VDC through the EPSUs. When the A/C power supply is not available, each EPSU with its integrated battery pack can supply 28VDC for a minimum of ten minutes to its connected emergency-lighting components.

Note that the EPSU battery pack is charged with 7.2VDC through an internal converter from 28VDC network.

One more internal converter (7.2VDC to 28VDC) operates when the EPSU battery pack supplies the emergency lighting network.

V1813401 - V01T0M0 - VM33D3EMERL3001



EMERGENCY-LIGHTING CONTROL DESCRIPTION

V1813401 - V01T0M0 - VM33D3EMERL3001

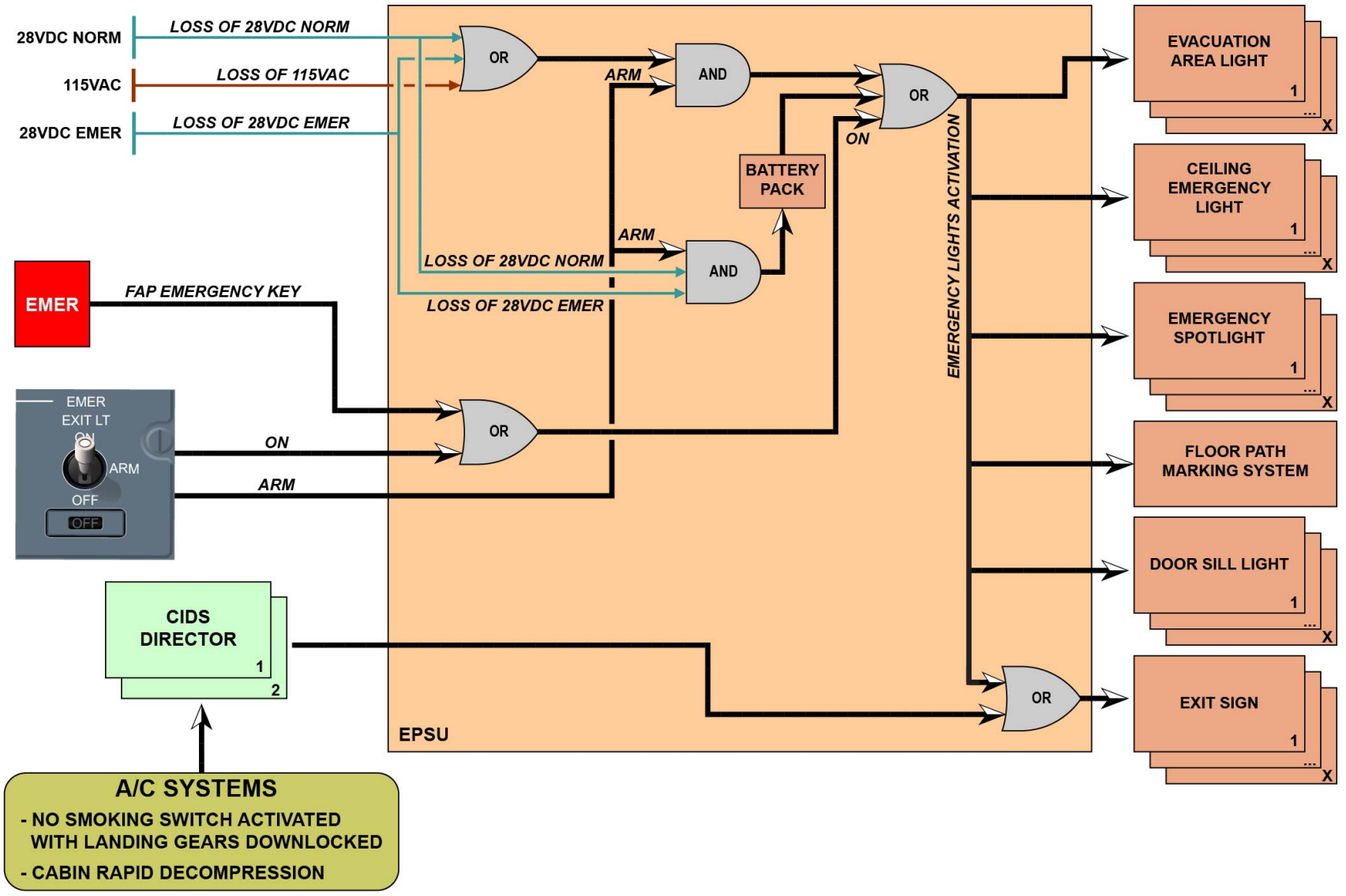
EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Emergency Power-Supply Unit: Functional Logic

The emergency lighting system can be started in all flight phases and its activation is managed by the EPSU internal logic.
Manual activation
- When the EMER EXIT LT switch is in the ON position, all the emergency lights come on (this is not applicable to the emergency slide lights). A manual activation of the system is also possible through the EMER key on the FAPs.
- When the EMER EXIT LT switch is in the OFF position, all the emergency lights go off and the OFF indicator light (below the EMER EXIT LT switch) comes on.

Note that, in this configuration, it is possible to use the FAP/EMER key to set the emergency lighting system to the on or off position manually.
Automatic activation
When the EMER EXIT LT switch is in the ARM position, the emergency lighting system is in automatic operation mode.
The EPSUs automatically energize all the emergency lights in, as a minimum, one of these conditions:
- Loss of 28VDC NORM (from SPDB)
- Loss of 28VDC EMER (from EPDC)
- Loss of 115VAC (from SPDB).

The exit signs also automatically come on when one of these conditions occurs:
- The NO SMOKING switch is set to the ON position when the landing gears are in the downlocked position.
- A rapid cabin decompression.



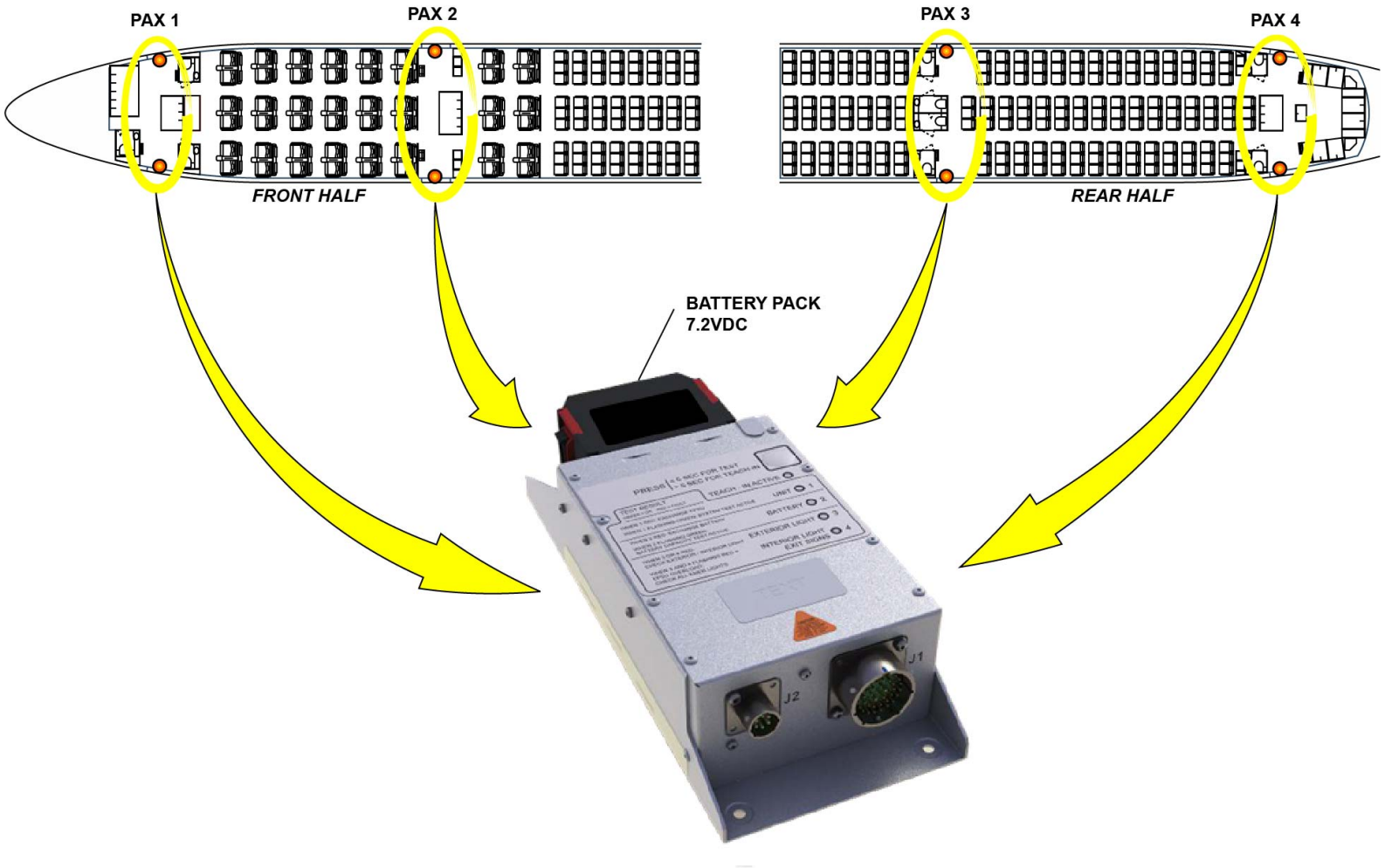
EMERGENCY POWER-SUPPLY UNIT: FUNCTIONAL LOGIC

V1813401 - V01T0M0 - VM33D3EMERL3001

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Emergency Power-Supply Units

The EPSUs supply the emergency lights with the 28VDC (NORM or EMER) network. The EPSUs includes a battery pack which electrically supplies the emergency light components.
Note that the EPSUs include a charge module that can charge the EPSU battery pack with 7.2VDC from the 28VDC aircraft network.
The EPSU battery pack can also supply the emergency lighting network with 28VDC through an internal converter (7.2VDC to 28VDC).
One EPSU is installed above each passenger door. A total of eight EPSUs are installed in the cabin.



EMERGENCY POWER-SUPPLY UNIT

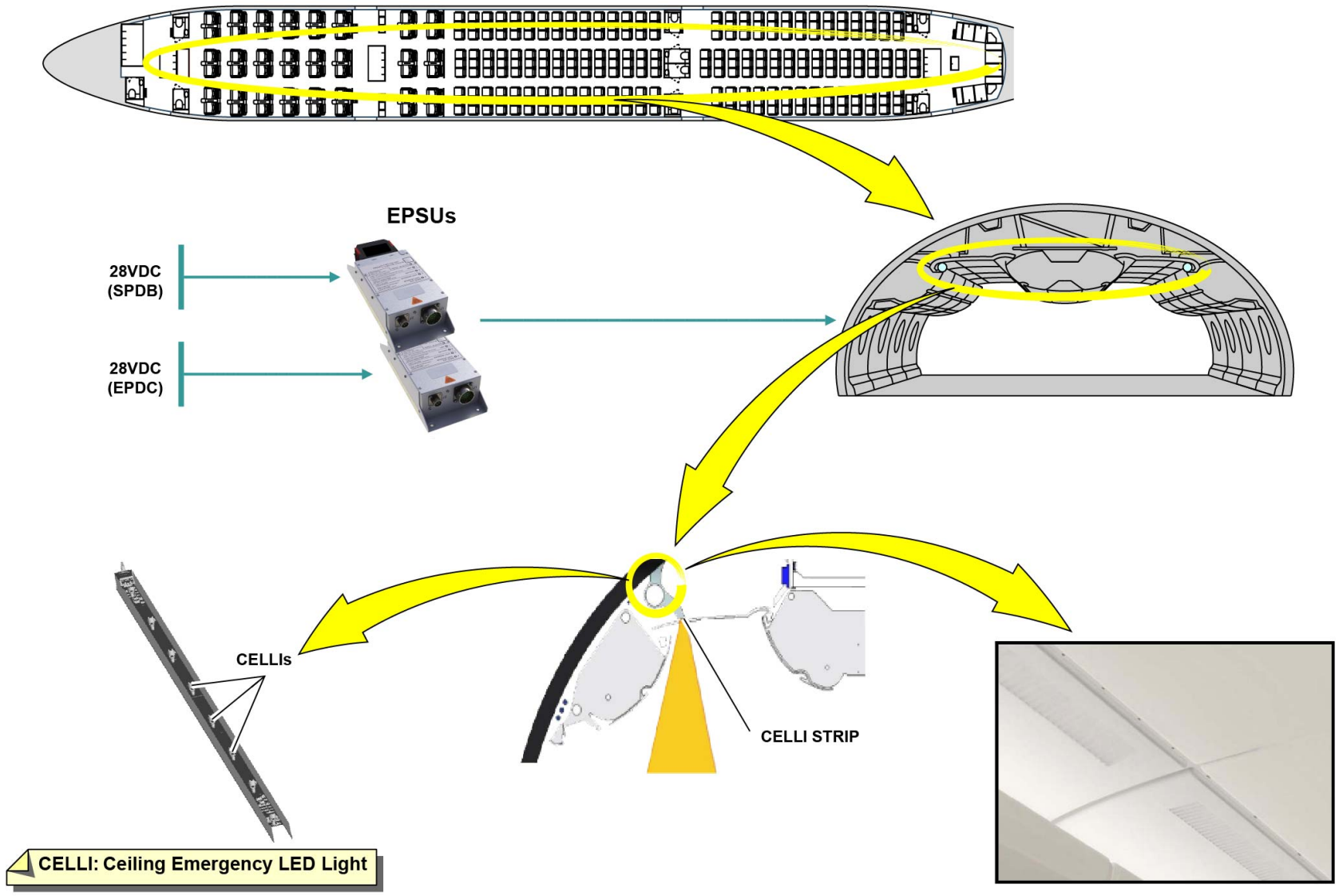
PAX: Passenger

EMERGENCY POWER-SUPPLY UNITS

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Ceiling Emergency LED-Lights

The Ceiling Emergency LED-Light (CELLI) strips supply a minimum of lighting to the main aisles in longitudinal direction when the emergency lighting is switched on. In this condition, the EPSUs electrically supply the CELLIs with 28VDC.
For redundancy, two EPSUs can supply each CELLI strip with 28VDC. Thus, if there is a failure of one EPSU, the second EPSU supplies each strip with 28VDC and half of the LEDs illuminates each strip.

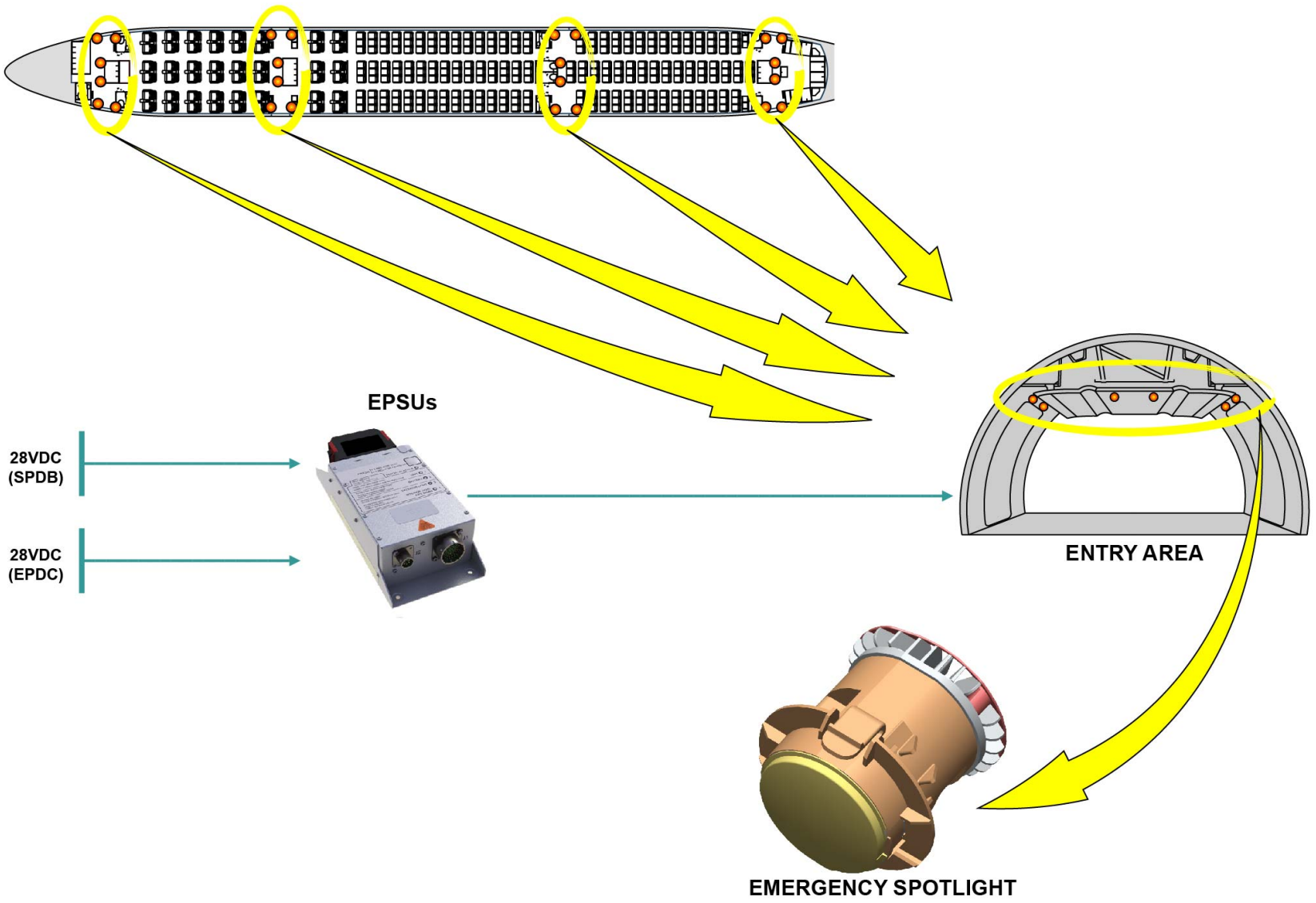


CEILING EMERGENCY LED-LIGHTS

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Emergency Spotlights

Most of the spotlights used for the general cabin lighting contain a different emergency light function. The emergency lighting part has different white LEDs. Then, the emergency spotlight has two different circuits, one for the general lighting and one for the emergency lighting.
In baseline configuration, the emergency spotlights are installed in cross aisles, entrances and special areas, where it is not possible to install CELLIs.
The spotlights emergency-lighting part illuminates these areas automatically when the emergency lighting system starts.
The EPSUs supply the spotlight emergency-lighting circuits with 28VDC.



EMERGENCY SPOTLIGHTS

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Floor-Path Marking System

If there is an emergency cabin evacuation, the floor-path marking system shows passengers the way to the exits, if it is not possible to see the overhead lighting (if there is smoke in the cabin for example).
The floor-path marking system has:
- A photoluminescent floor-path marking-system or an electrical floor-path marking-system. Each system shows the escape path at floor level.
- Exit identifiers that show the location of the exits near the floor level.

The electrical floor-path marking-system includes:
- The seat-mounted emergency lights to illuminate the main aisles (white or red color)
- The Wall Mounted Emergency Lights (WMELs) and Edge Mounted Emergency Lights (EMELs) to illuminate areas in front of galleys and lavatories.

The electrical floor-path marking-system uses LED technology.
The EPSUs can supply the electrical floor-path marking system.
The non-electrical floor-path marking includes floor-path marking-system strips that are photoluminescent.

V1813401 - V01T0M0 - VM33D3EMERL3001

PHOTO LUMINESCENT FPMS

WALL-MOUNTED EMERGENCY LIGHT

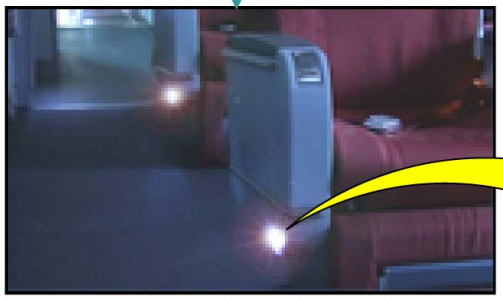
EXIT IDENTIFIER

28VDC (SPDB)

28VDC (EPDC)

EPSUs

EDGE-MOUNTED EMERGENCY LIGHT



SEAT-MOUNTED EMERGENCY LIGHT

FPMS: Floor-Path Marking System

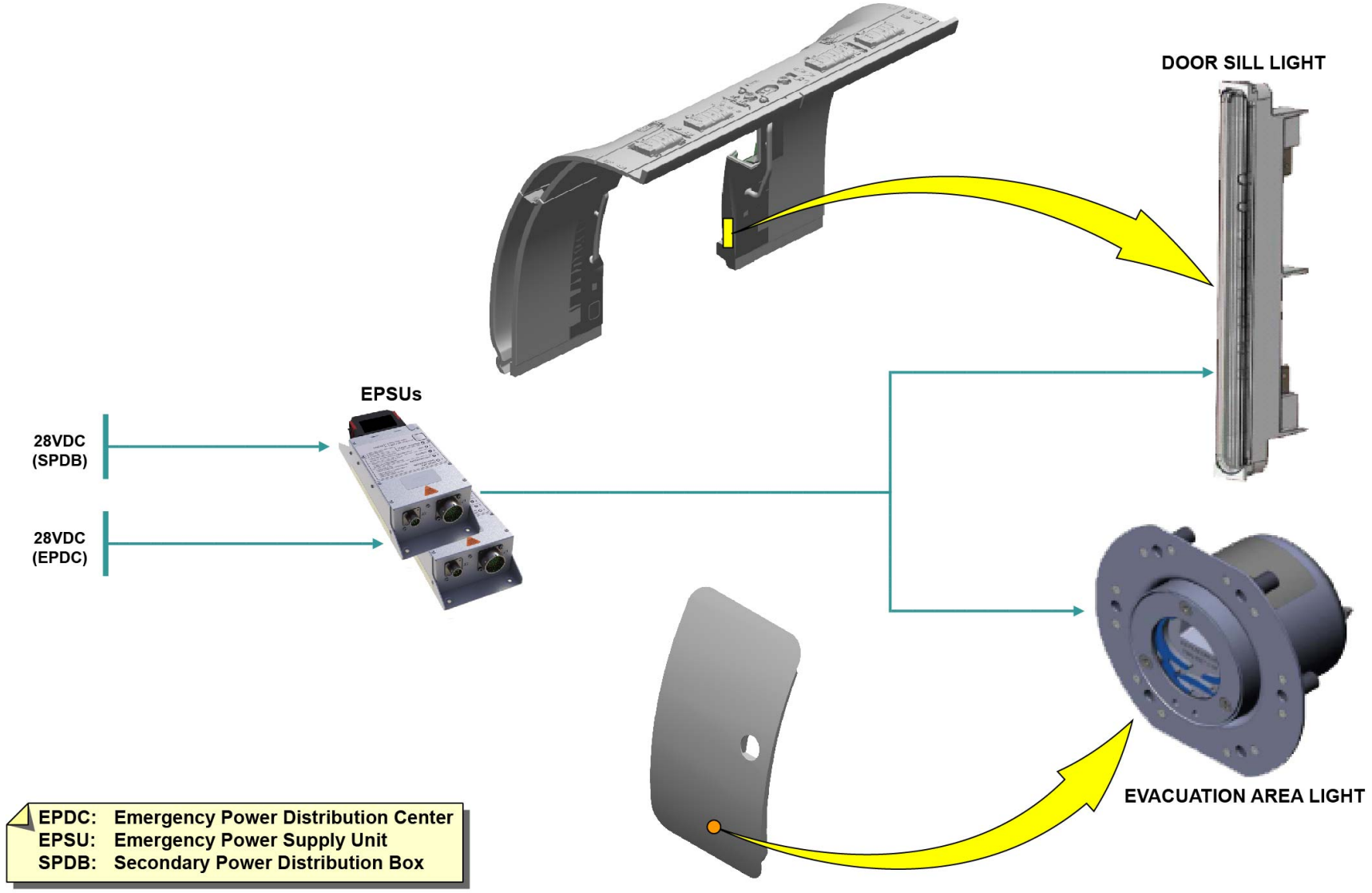
FLOOR-PATH MARKING SYSTEM

V1813401 - V01T0M0 - VM33D3EMERL3001

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Door Sill Lights and External Evacuation-Area Lights

The door sill lights are part of the EMELs. They are installed flush mounted in the door frame near the floor to illuminate the sensitive section of the door sill area.
The external EVAC-area lights illuminate the area where the deployed emergency slide hits the ground. The EVAC area lights are installed in the fuselage in each door.
The door sill lights and external EVAC-area lights use white LED and are supplied with 28VDC output of the EPSUs.



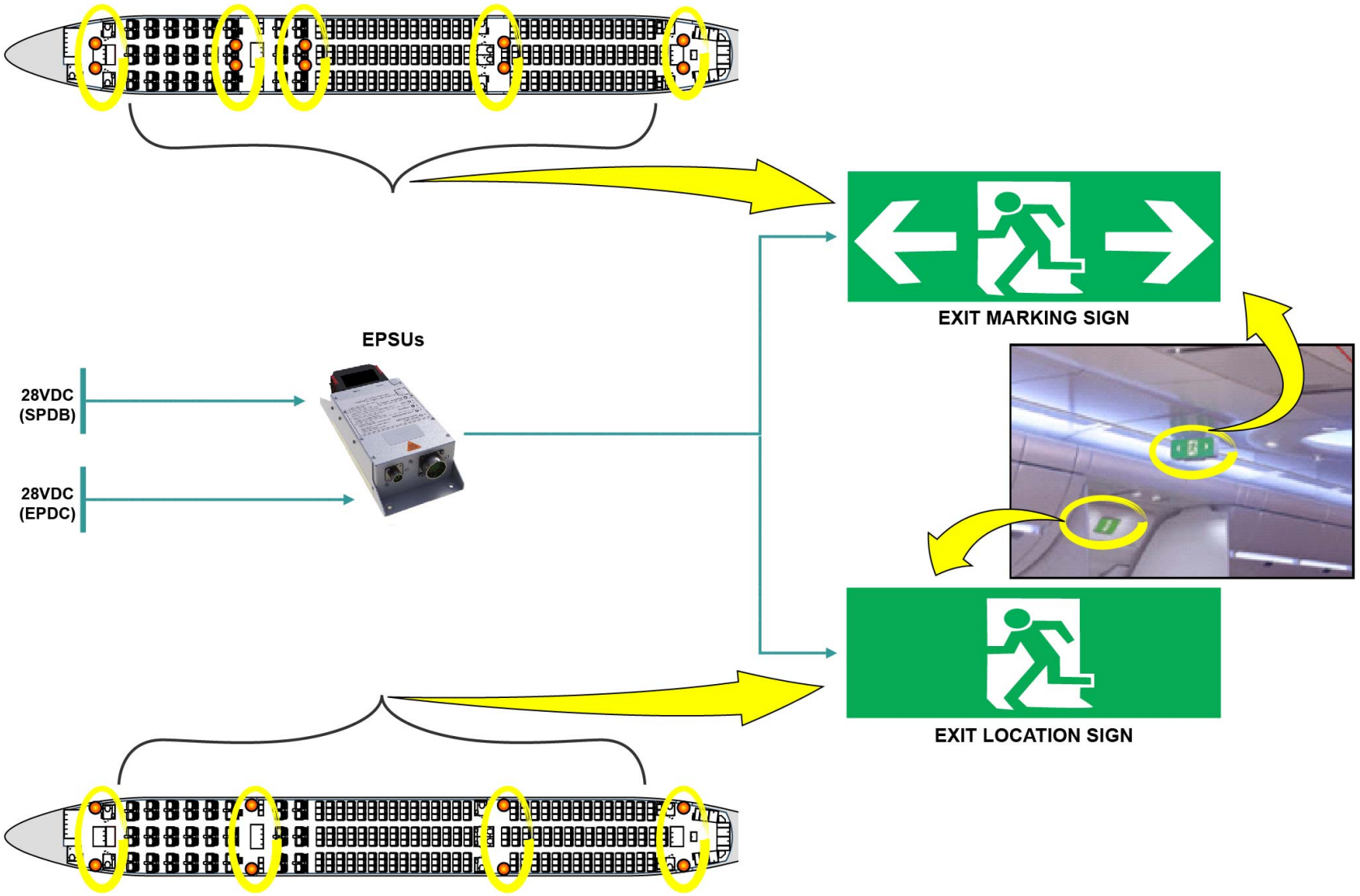
DOOR SILL LIGHTS AND EXTERNAL EVACUATION-AREA LIGHTS

EMERGENCY LIGHTING SYSTEM DESCRIPTION (2/3)

Exit Signs

There are two types of exit signs:
- The exit location signs on the ceiling to show the position of the exit areas. They can be seen from each point of the main aisles.
- The exit marking signs above the exits to show the position of the doors.

The exit signs use LED technology.
The EPSUs supply the exit signs with 28VDC when the emergency lighting system starts.


EPSUs
28VDC
(SPDB)
28VDC
(EPDC)
EXIT MARKING SIGN
EXIT LOCATION SIGN

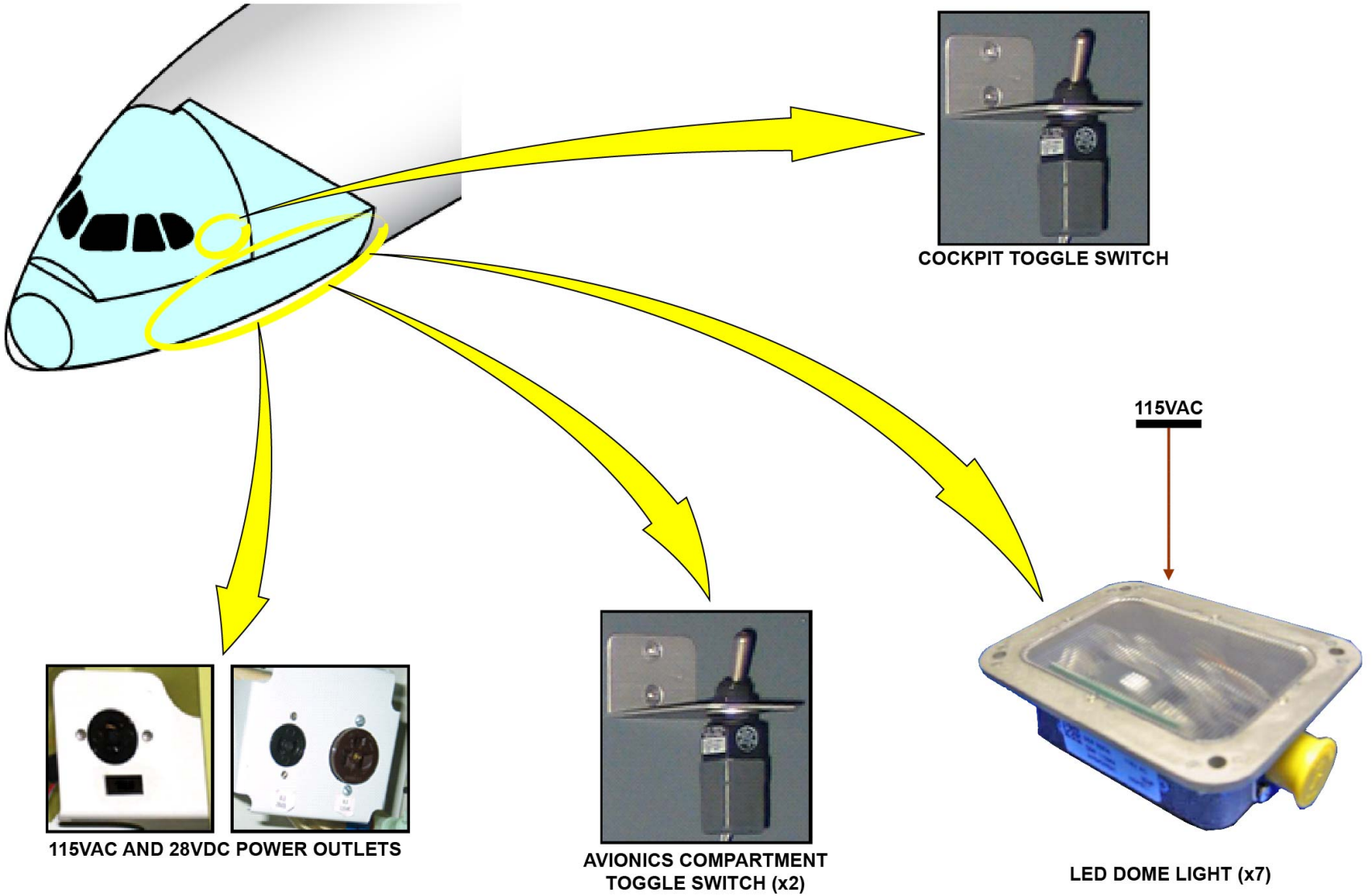
EXIT SIGNS

CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Avionics Compartment

The avionics compartment illumination is done by LED dome lights.
The LED dome lights are supplied with 115VAC.
Three toggle switches control the LED dome lights:
- One toggle switch is in the cockpit
- Two toggle switches are in the avionics compartment.

Three power outlets are in the avionics compartment:
- One 115VAC power outlet
- Two 28VDC power outlets.



AVIONICS COMPARTMENT

CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Cargo Lighting Overview

The cargo-compartments lighting system contains:
- The service panels lights
- The loading area lights
- The cargo compartment lights.

All the cargo lights use LED technology.
Note that all the cargo lights are supplied with 28VDC.

Service panel lights

The service panel lights give sufficient illumination to each cargo-door operation panel (1 FWD and 1 aft) and cargo-loading control panel (1 FWD and 1 aft).
Each service panel light comes on automatically when the A/C is on ground with the two engines stopped. The flight phase data is sent by the FWS to the Secondary Power Distribution Boxes (SPDBs) which supply the service panels lights with 28VDC.

Loading area lights

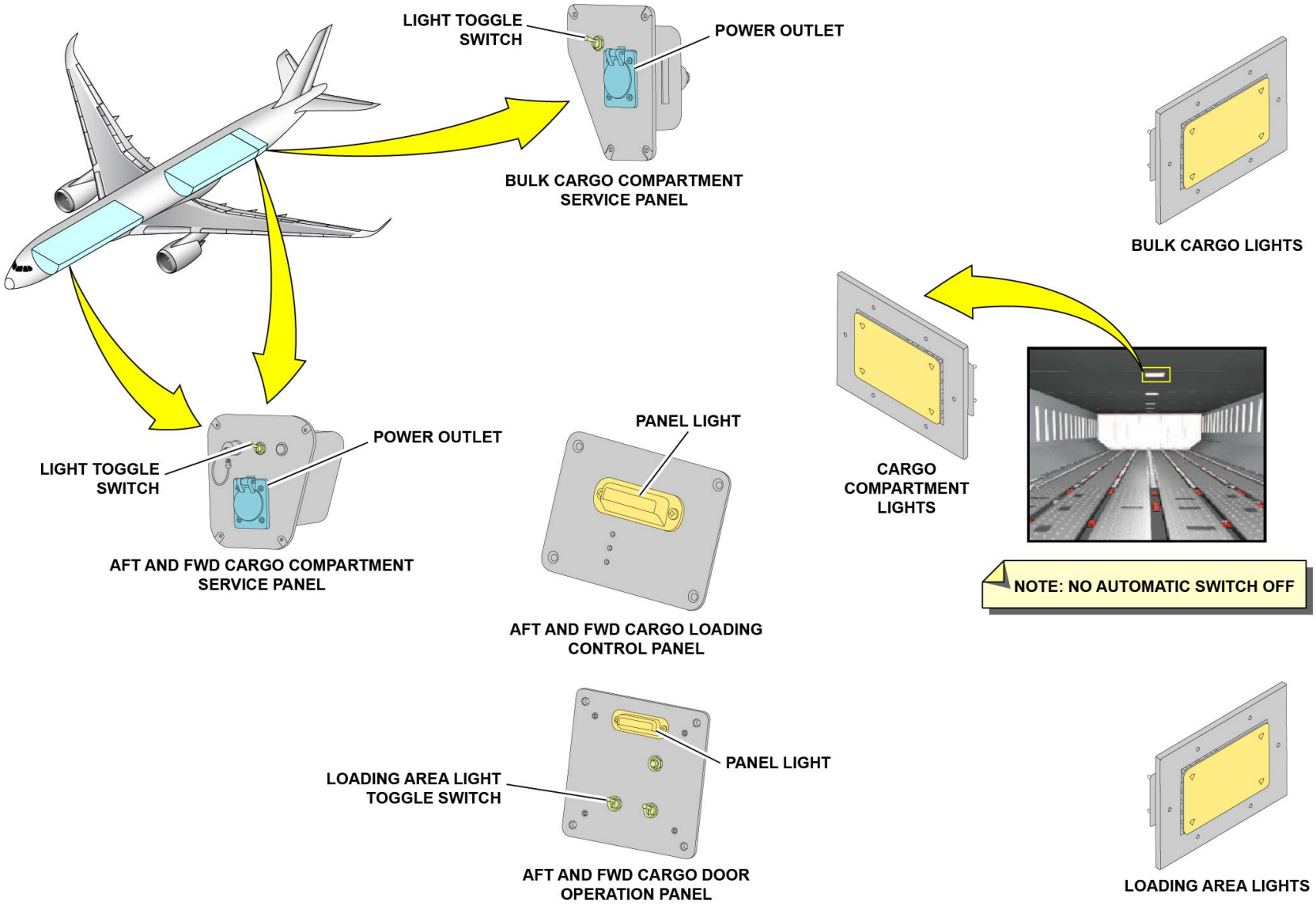
A loading area light is installed in the entry area of the FWD and aft cargo-compartments, on the ceiling of each cargo door. These lights supply sufficient lighting to cargo loading areas.
The SPDBs supply the loading area lights with 28VDC.
The loading area lights are controlled by a loading-area light toggle-switch on each cargo-door operation panel.
If a cargo door is closed and latched, the Door and Escape Slide Control System (DSCS) sends a discrete signal to the related SPDB through the AFDX network. Then, the SPDB automatically sets the related loading area lights to the off position.

Cargo compartment lights

There are cargo compartment lights in the ceilings of each cargo compartment:
- In the FWD cargo compartment
- In the aft cargo compartment
- In the bulk cargo compartment.

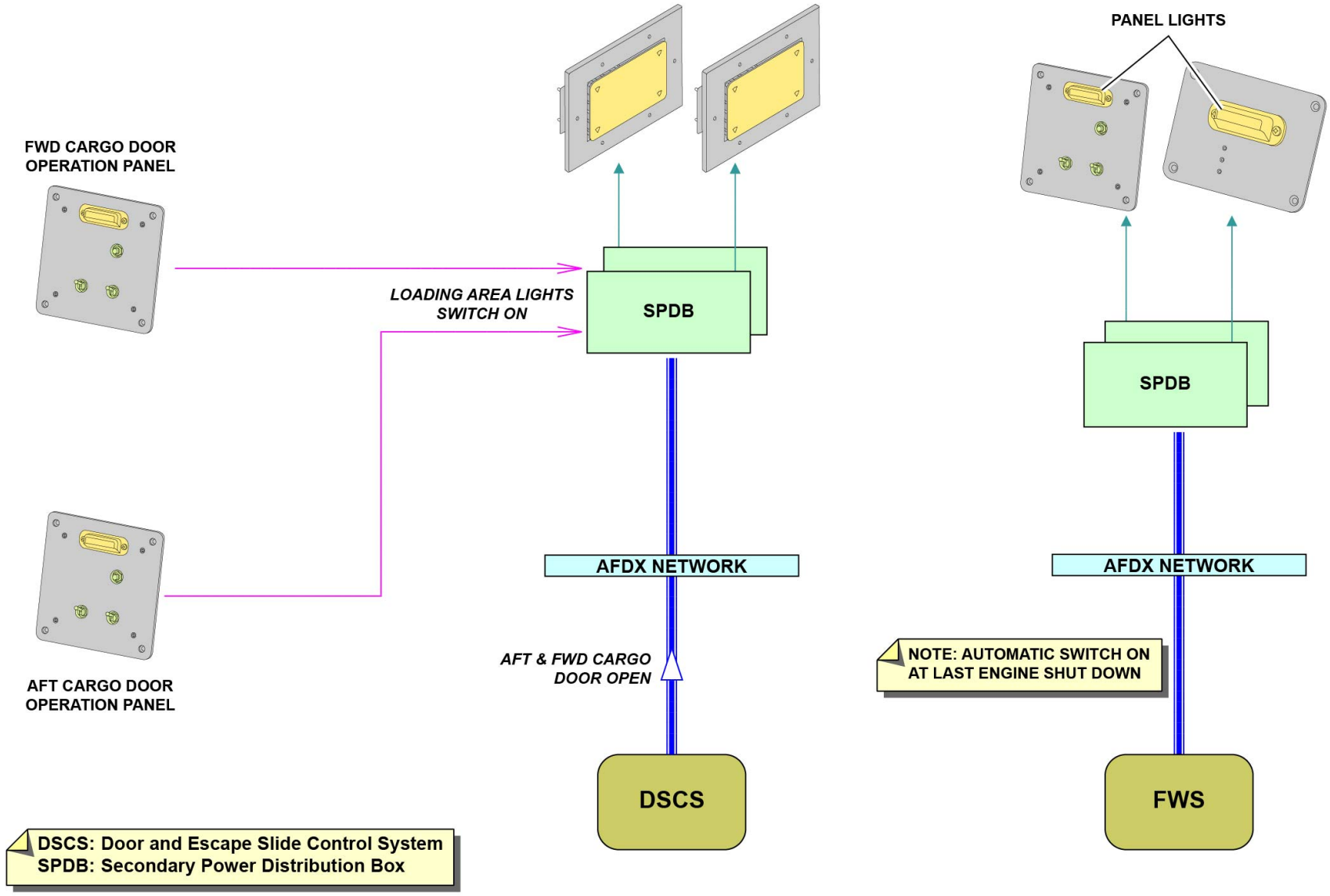
Note: these lights will stay on if they were set to the on position before, when A/C was on ground.
There is a cargo-compartment light toggle-switch at each service panel to control the related cargo-compartment lights.
Each service panel has a 115VAC power outlet.

V1813401 - V01T0M0 - VM33D4CASVC2301



CARGO LIGHTING OVERVIEW - SERVICE PANEL LIGHTS ... CARGO COMPARTMENT LIGHTS

V1813401 - V01T0M0 - VM33D4CASVC2301



CARGO LIGHTING OVERVIEW - SERVICE PANEL LIGHTS ... CARGO COMPARTMENT LIGHTS

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CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Wheel-Well, Belly Fairing, Air Conditioning Duct and Accessory Compartment Lighting

Lighting of the nose landing gear bays

Three LED bay lights illuminate the Nose Landing Gear (NLG) bay.
The NLG LED bay lights are supplied with 115VAC by the EPDC.
A toggle switch controls the bay lights.
There are two power outlets in NLG bay:
- One 28VDC power outlet
- One 115VAC power outlet.

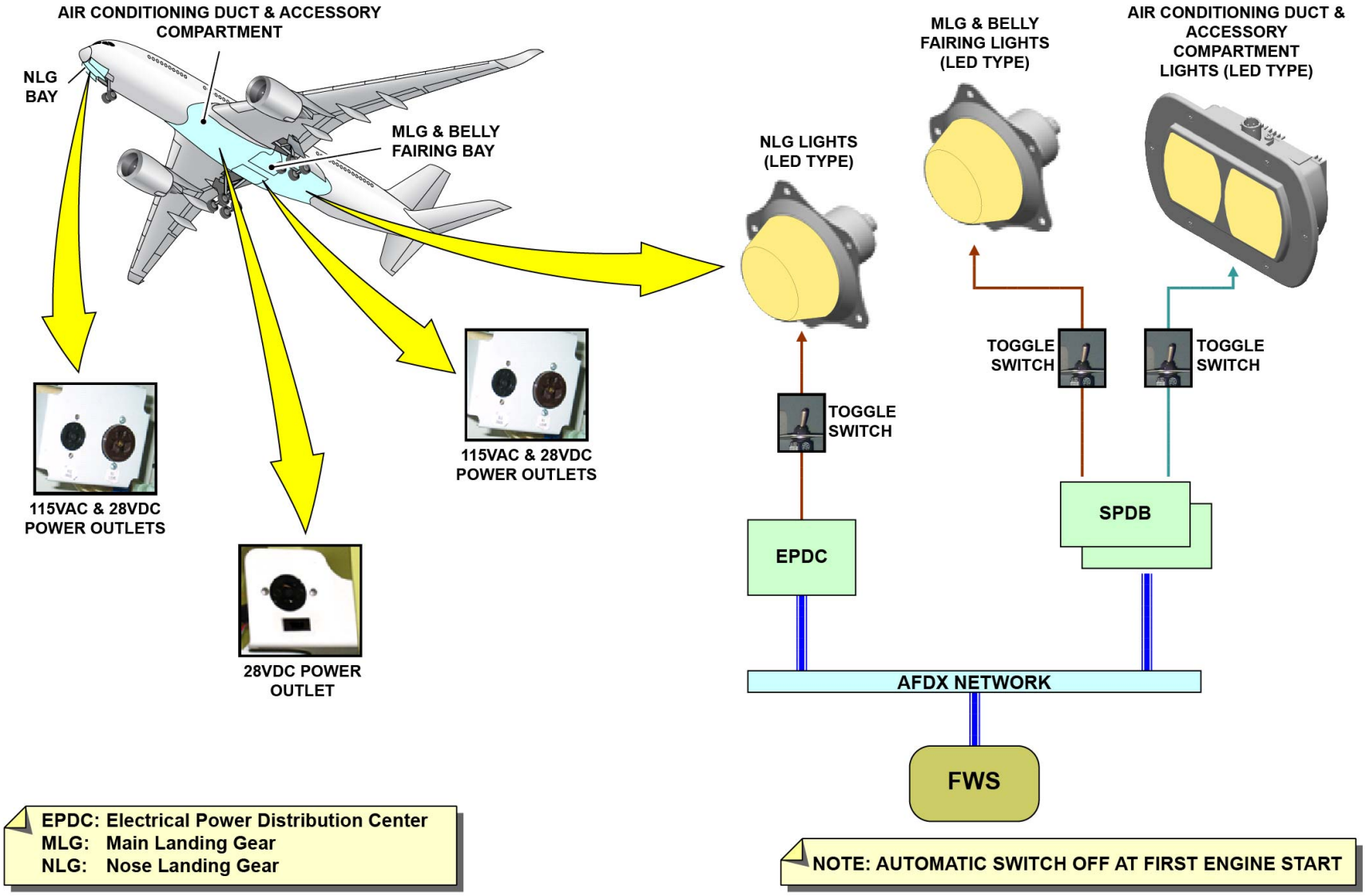
Note that the LED lights and the power outlets are supplied in ground service configuration.

Lighting of the main landing gear bay and belly fairing

Eight LED bay lights illuminate the Main Landing Gear (MLG) bay and belly fairing. The bay lights are supplied with 115VAC through the SPDBs. Two toggle switches control the MLG bay and belly-fairing lights.
Note that the LED lights and the 115VAC power outlets are supplied in ground service configuration.
These LED lights can be set to the on position with the toggle switch only when the A/C is on ground with the two engines stopped. The flight phase data is sent by the FWS to the SPDBs that control the supply of 115VAC to the lights.
The 28VDC and 115VAC outlets are supplied in ground service configuration.

Air conditioning duct and accessory compartment lighting

The air conditioning duct and accessory compartment lighting has two LED lights and one 28VDC power outlet. A toggle switch controls the lights.
Note that the LED lights and the power outlet are supplied in ground service configuration.
The air conditioning duct and accessory compartment LED-lights can be set to the on position with the toggle switch only when the A/C is on ground with the two engines stopped.
The flight phase data is sent by the FWS to the SPDBs that control the supply of 28VDC to the lights.
The 28VDC power outlet is supplied in ground service configuration.



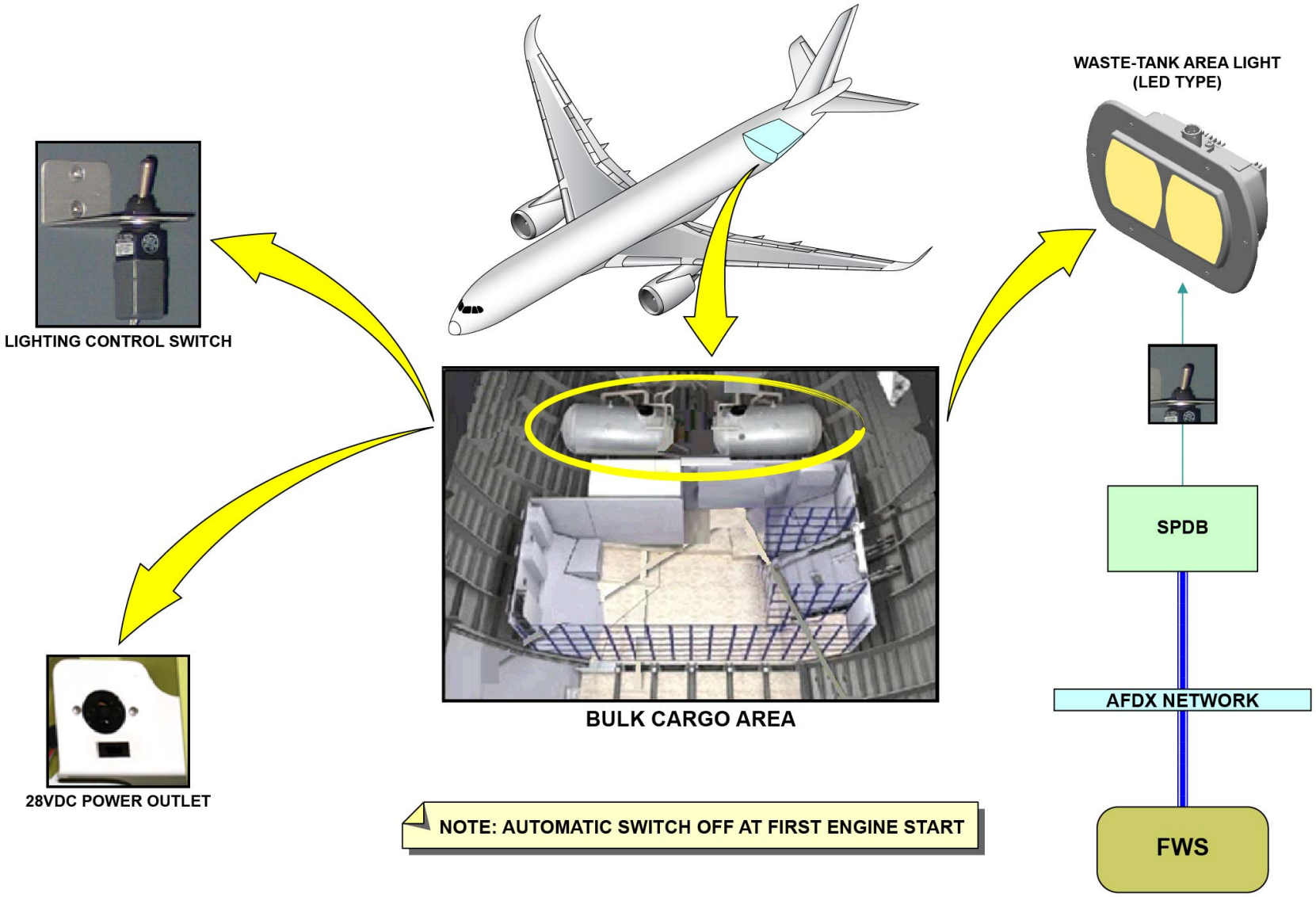
WHEEL-WELL, BELLY FAIRING, AIR CONDITIONING DUCT AND ACCESSORY COMPARTMENT LIGHTING - LIGHTING OF THE NOSE LANDING GEAR BAYS ... AIR CONDITIONING DUCT AND ACCESSORY COMPARTMENT LIGHTING

CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Service Area Lighting

Waste-tank area lights

The waste tank area has two service area LED lights that are controlled by a toggle switch. This toggle switch is installed near the maintenance door of the aft wall of the bulk cargo compartment.
The system includes one 28VDC power outlet.
The waste-tank area LED lights can be set to the on position with the toggle switch only when the A/C is on ground with the two engines stopped. The flight phase data is sent by the FWS to the SPDBs that control the supply of 28VDC to the lights.
Note that the LED lights and the 28VDC power outlet are supplied in ground service configuration.



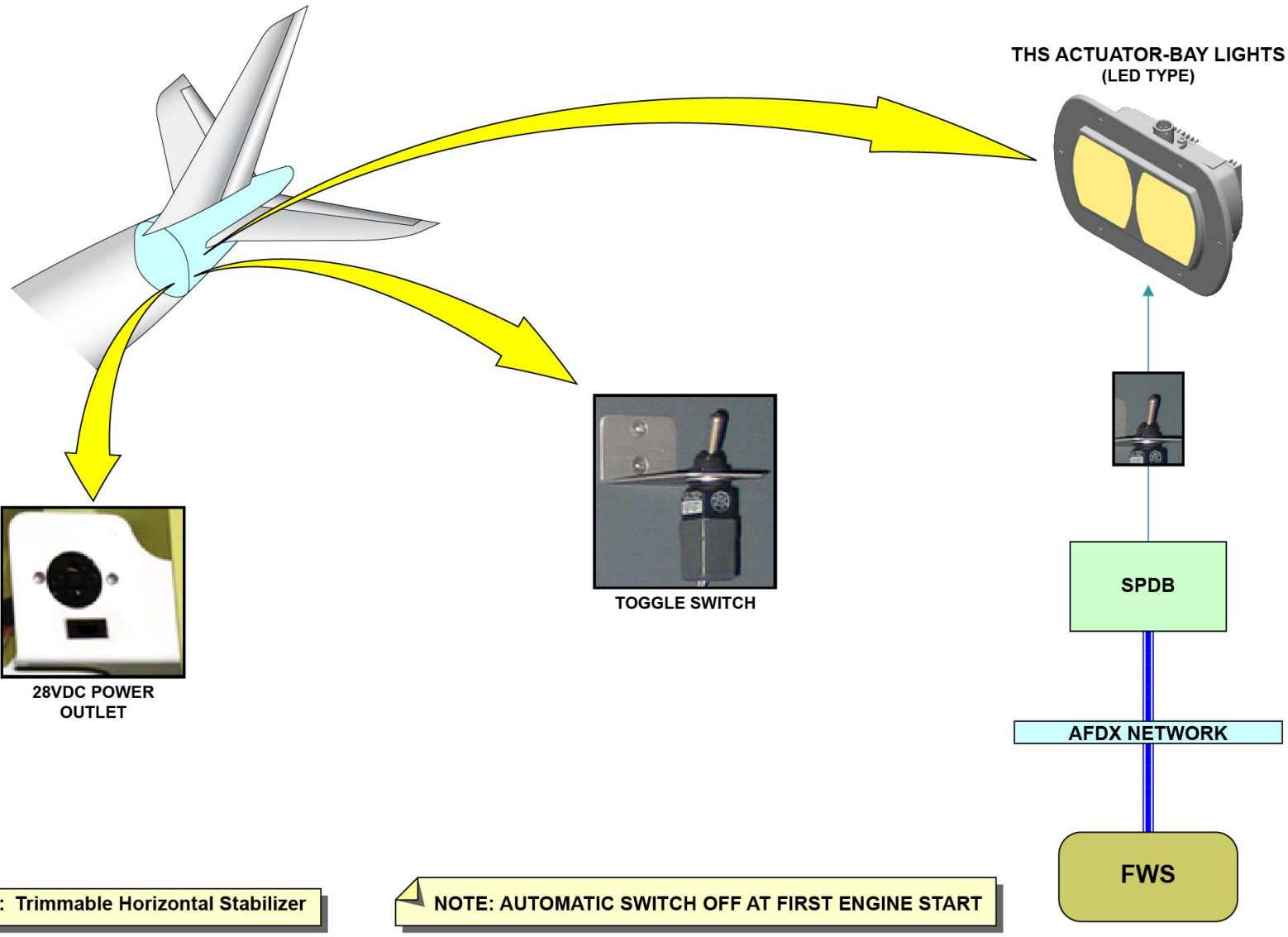
SERVICE AREA LIGHTING - WASTE-TANK AREA LIGHTS

CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Service Area Lighting (continued)

Trimmable horizontal-stabilizer actuator bay lights and power outlets

The Trimmable Horizontal Stabilizer (THS) bay has four LED lights controlled by a toggle switch.
There are two 28VDC power outlets in the THS bay.
The LED lights of the THS actuator bay can be set to the on position with the toggle switch only when the A/C is on ground with the two engines stopped. The flight phase data is sent by the FWS to the SPDBs that control the supply of 28VDC to the lights.
Note that the LED lights and the power outlet are supplied in ground service configuration.



SERVICE AREA LIGHTING - TRIMMABLE HORIZONTAL-STABILIZER ACTUATOR BAY LIGHTS AND POWER OUTLETS

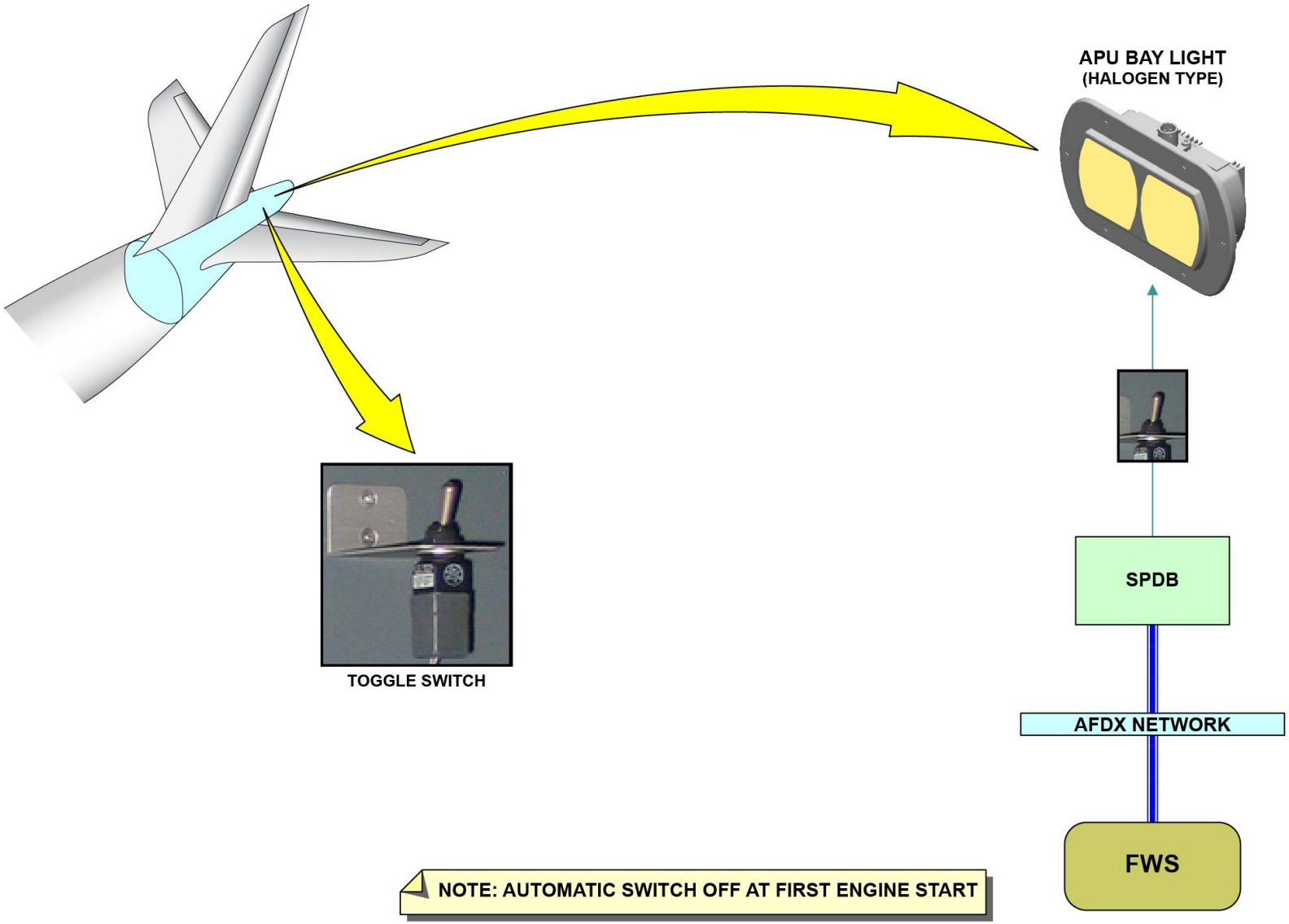
V1813401 - V01T0M0 - VM33D4CASVC2301

CARGO AND SERVICE COMPARTMENT LIGHTING (2)

Service Area Lighting (continued)

APU bay lights and power outlets

The APU bay has one halogen light. Two toggle switches control this halogen light.
The APU bay LED-light can be set to the on position only when the A/C is on ground with the two engines stopped. The flight phase data is sent by the FWS to the SPDB that controls the supply of 28VDC to the light through the toggle switches.
A 28VDC power outlet is available.
The LED lights and the 28VDC power outlet are supplied in ground service configuration.



SERVICE AREA LIGHTING - APU BAY LIGHTS AND POWER OUTLETS

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

General Architecture and Operation

The exterior lighting system can be controlled:
- Manually from the EXT LT panel of the Integrated Control Panel (ICP)
- Automatically depending on A/C configurations.

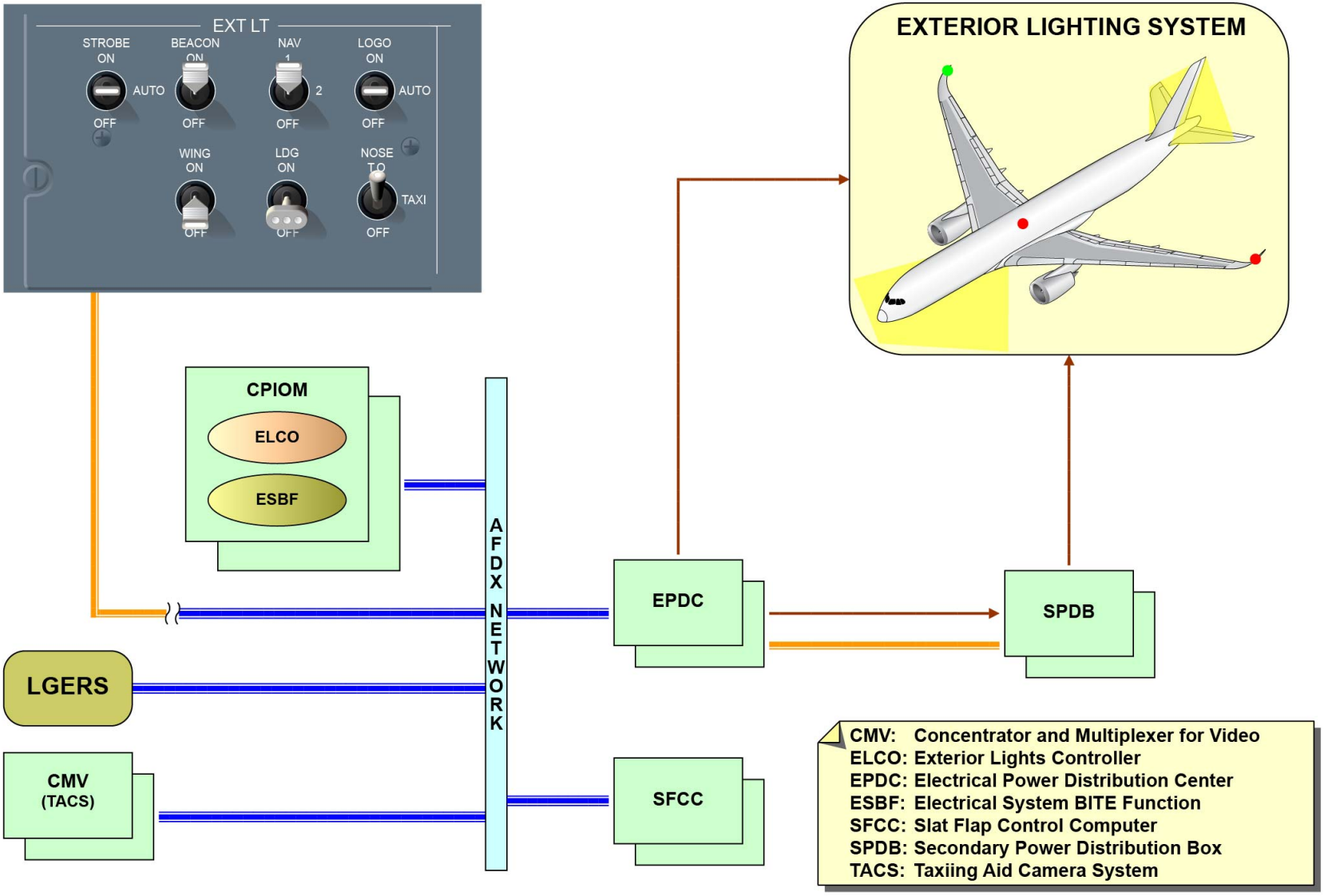
All the control signals (on/off/auto) are transmitted through the AFDX network to the two CPIOMs. An Exterior Lights Controller (ELCO) is installed in the CPIOMs. The ELCO software uses the data sent by the EXT LT control switches and the data which come from the different A/C systems to compute the lights control orders.
Then, the ELCO sends the control signals, through the AFDX network, to the Electrical Power Distributions Centers (EPDCs) and Secondary Power Distribution Boxes (SPDBs) to set the exterior lights to the on or off position.

ELCO software

The ELCO software is used to control and monitor the exterior lighting system. The ELCO software is hosted in two different CPIOMs. The two applications operate independently in each CPIOM.
The ELCO software has interfaces through the AFDX network with the systems that follow:
- The ICP EXT LT control panel (through the CRDCs), to receive the toggle switch status.
- The Slat and Flap Control Computers (SFCCs), to receive the flap position for automatic control of the LOGO lights.
- The LGERS, to receive the landing gear status which is used for the automatic control of some external lights (strobe lights for example).
- The Concentrators and Multiplexers for Video (CMVs), to receive the selection status of the taxi aid cameras.
- The EPDCs, to control the lights through the Solid State Power Controllers (SSPCs).
- The SPDBs (through EPDCs), to control the lights through the SSPCs.

When there is a communication failure in the external lighting system (ICP EXT LT or/and CRDCs or/and AFDX network failure), the EPDCs, by default, cause to come on the lights that follow:
- Navigation lights
- Landing lights
- Anti-collision lights
- Wing/engine scan lights.

In this configuration, the EPDCs set the remaining lights (i.e.: the taxi lights, takeoff lights, taxi camera lights, logo lights) to the off position.



GENERAL ARCHITECTURE AND OPERATION - ELCO SOFTWARE

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Anti-Collision Lights

The anti-collision lighting system generates different flashing light signals to the external part of the A/C to prevent collisions in flight.
The anti-collision lighting system includes:
- The strobe lights
- The beacon lights.

Two toggle switches independently control the anti-collision lighting system. The anti-collision lights operate in a synchronized mode when the STROBE toggle switch is set to the AUTO position and the BEACON toggle switch is set to the ON position.
For redundancy purpose in the anti-collision lighting system, the EPDC connections are as follows:
- EPDC 1 supplies the beacon lights
- EPDC 2 supplies the strobe lights.

Anti-collision strobe lights

The function of the strobe-lights is to prevent collision.
The anti-collision strobe-light system has:
- Two FWD strobe-light units
- One rear strobe-lights unit.

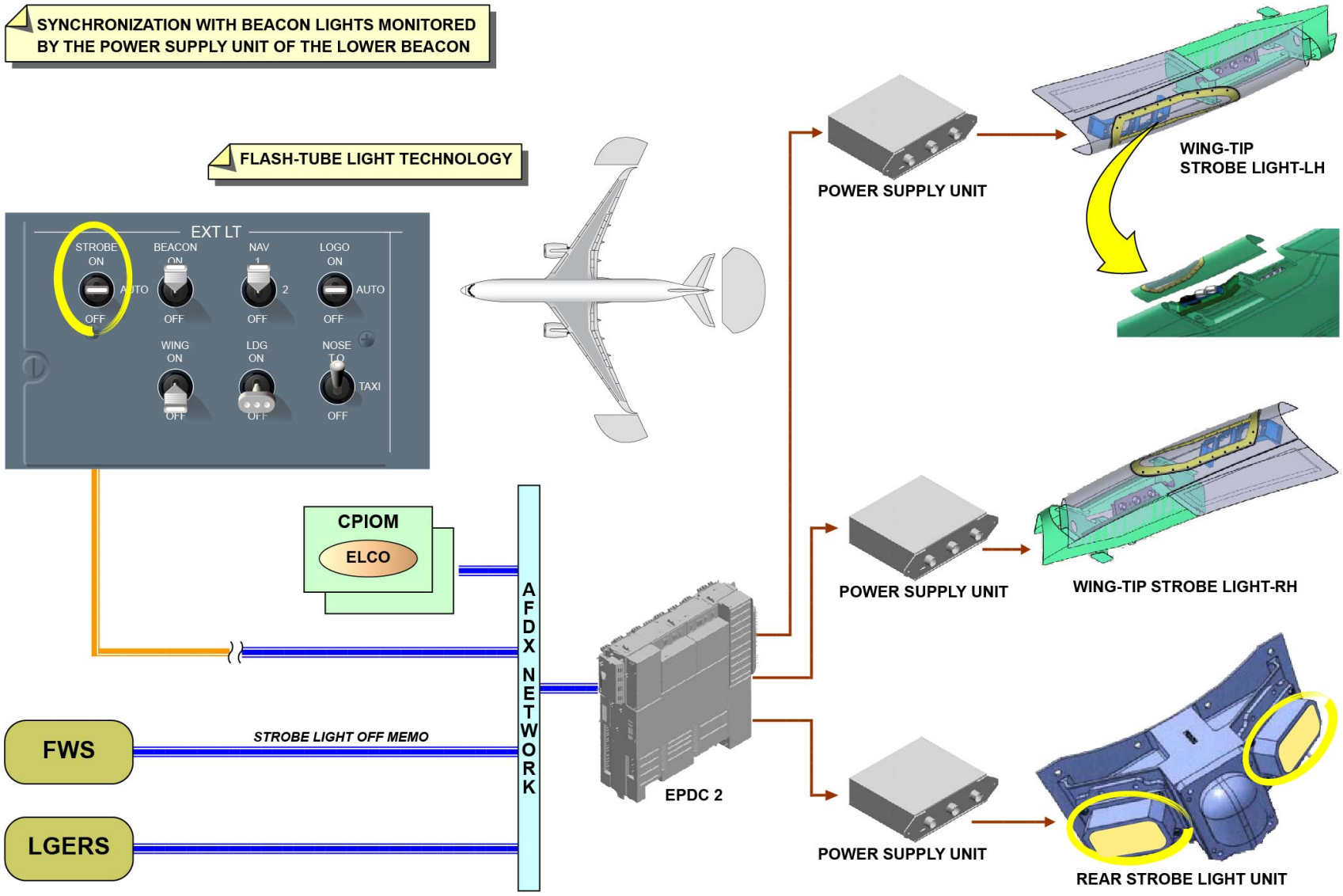
It includes a total of six white flash tube lights.
Each FWD strobe-light unit, which is installed in each wing tip leading-edge of the A/C, has:
- Two single flash-tube lights
- A separate Power Supply Unit (PSU).

The rear tail cone strobe-light, which is installed on the tail cone of the A/C, has:
- Two flash tube lights
- An isolated PSU.

Note that each PSU receives 115VAC from EPDC 2 and supplies an applicable high voltage to each strobe light.

The PSU of the lower beacon light monitors the synchronization between the strobe and the beacon lights.
The three-way STROBE toggle switch on the EXT LT control panel controls all the flashing strobe lights.
When the STROBE toggle switch is set to:
- ON: all the strobe lights start to flash.
- AUTO: all the strobe lights start to flash, if the A/C is airborne (confirmed by a L/G not on ground signal from the LGERS). Otherwise, the strobe lights stay off if the A/C is on ground.
- OFF: the strobe lights stay off.

Note: If the STROBE toggle switch is set to the OFF position with A/C in-flight (confirmed by a L/G not on ground signal), the STROBE LT OFF memo is shown on the ECAM.
Operation
The position of the STROBE toggle switch is first sent to the CPIOMs which host the ELCO software. Then the ELCO software processes the toggle-switch status data and control the strobe lights (on or off) through EPDC 2. EPDC 2 supplies 115VAC power to the PSUs of the strobe lights.



ANTI-COLLISION LIGHTS - ANTI-COLLISION STROBE LIGHTS

V1813401 - V01T0M0 - VM33D5EXTL03001

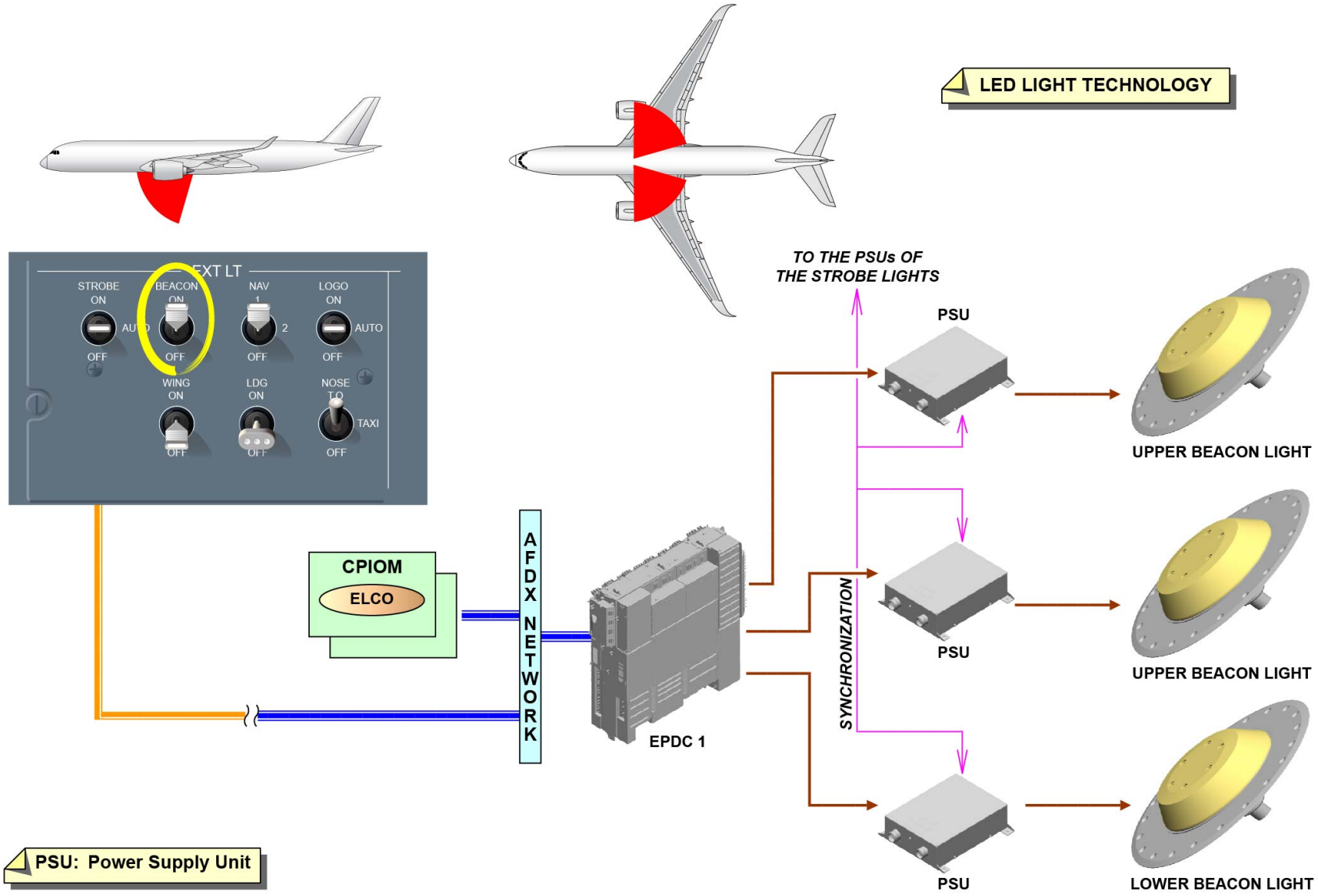
EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Anti-Collision Lights (continued)

Anti-collision beacon lights

The function of the beacon lights is to prevent collision.
The beacon light system has three red flashing beacon lights:
- Two beacon lights are installed on the top of the fuselage
- One beacon light is installed on the bottom of the fuselage.

Note that the beacon lights use LED technology.
Each beacon light is supplied by a different PSU. Each PSU receives 115VAC from EPDC 1.
The BEACON toggle switch on the EXT LT control panel controls the three beacon lights with ON and OFF positions.
Operation
The position of the BEACON toggle switch is first sent to the CPIOMs which host the ELCO software. Then the ELCO software processes the toggle-switch status data and controls the beacon lights (on or off) through EPDC 1. EPDC 1 supplies the PSUs of the beacon lights with 115VAC.
Note that the PSU of the lower beacon light controls the synchronization between the strobe and beacon lights through a specific analog wire.



ANTI-COLLISION LIGHTS - ANTI-COLLISION BEACON LIGHTS

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Navigation Lights

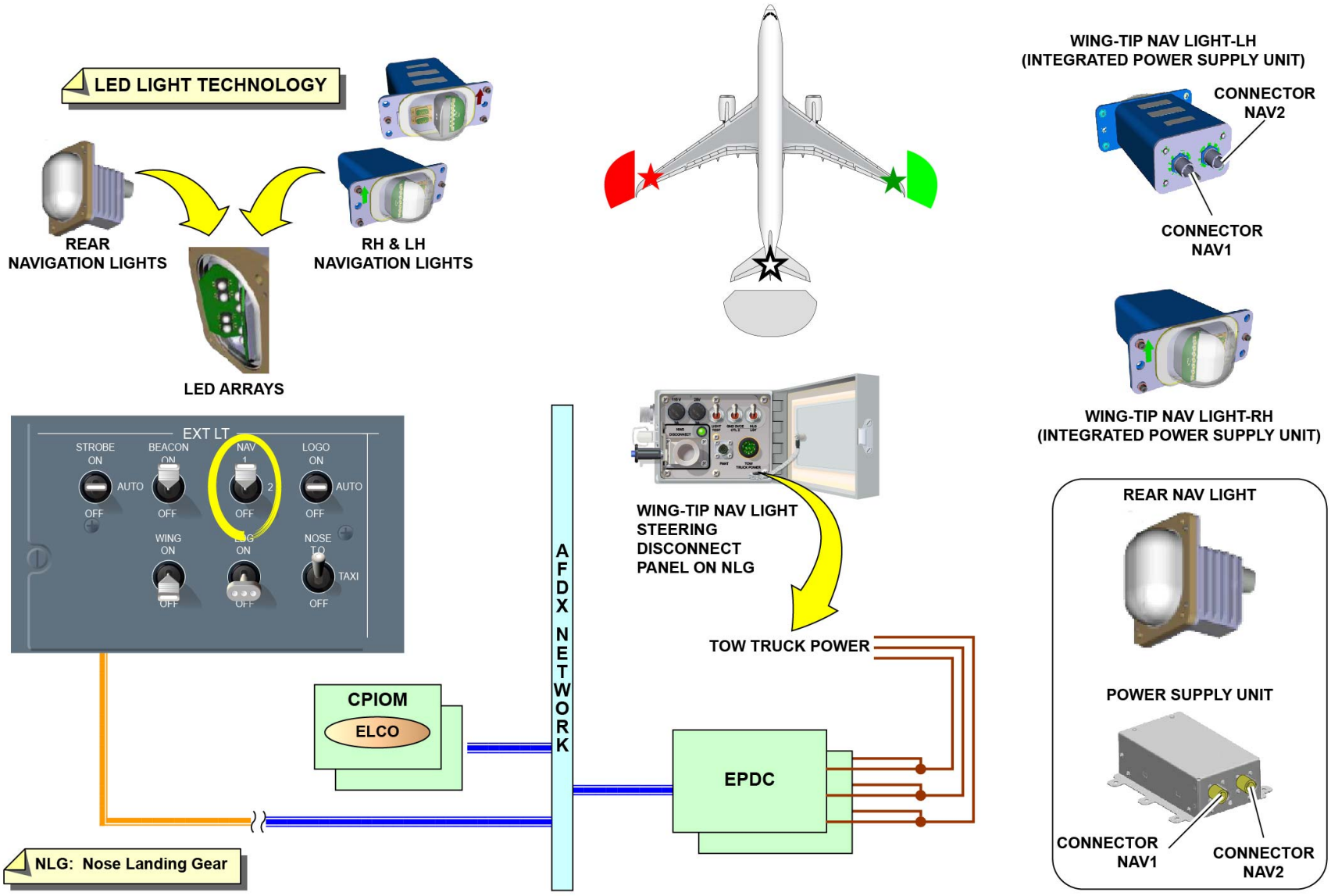
The NAV lights system gives an external and visual indication of the A/C position and its flight direction.
The navigation lights contain:
- One navigation LED-light, which is installed at the leading edge of each wing tip. The right LED-light is green. The left LED-light is red.
- One white navigation LED-light, which is installed on the tail cone below the APU outlet.

Each wing-tip navigation-light has one integrated PSU and the rear tail-cone light has a separated PSU.
For redundancy purpose, the wing-tip left (red color) and the right (green color) navigation lights and the rear navigation light include two LED arrays.
Each LED array is electrically supplied independently from one of the EPDC:
- EPDC 1 for the NAV1 supply
- EPDC 2 for the NAV2 supply.

Note that the three PSUs of these lights include two different power-supply connectors:
- The NAV1 connector receives 115VAC from EPDC 1
- The NAV2 connector receives 115VAC from EPDC 2.

Then, the PSU supplies the necessary VDC voltage to the selected LED array from EPDC 1 or EPDC 2.
The NAV toggle switch on the EXT LT control panel controls the navigation lights with the 1 (for NAV1), 2 (for NAV2) and OFF positions.
The NAV lights are on when the NAV toggle switch are set to the 1 or 2 position.
Note that the NAV1 system is the primary selection and the NAV2 system is selected when the NAV1 is not available.
The NAV lights can also be energized from steering disconnect-panel circuit on the Nose Landing Gear (NLG) through the tow truck power-connector.

Operation
The position of the NAV toggle switch is first sent to the CPIOMs which host the ELCO software. Then the ELCO software processes the toggle-switch status data and controls the navigation lights (NAV1 on, or NAV2 on, or off) through EPDC 1 or EPDC 2.



NAVIGATION LIGHTS

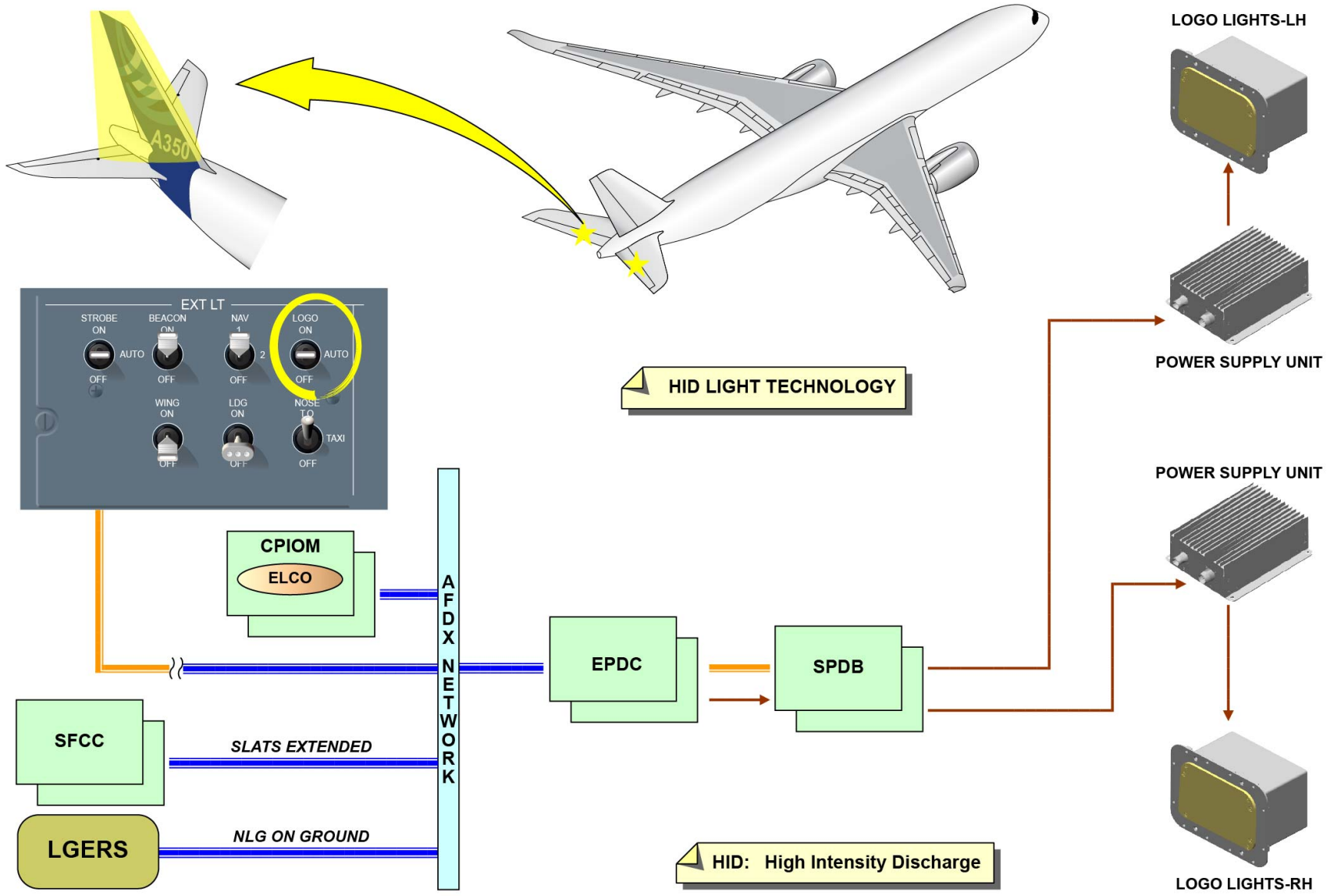
V1813401 - V01T0M0 - VM33D5EXTL03001

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Logo Lights

The logo lights are used to illuminate the airline logo on the vertical stabilizer.
One logo light unit (composed of one High Intensity Discharge (HID) light) is installed on each side of the Trimmable Horizontal Stabilizer (THS).
Each light is connected to a different PSU, which is supplied with 115VAC from the SPDBs.
Note that the SPDBs are directly controlled by the EPDCs.
The three-way LOGO toggle switch on the EXT LT control panel controls the logo lights.
When the LOGO toggle switch is set to:
- ON: the logo lights come on.
- AUTO: the logo lights come on automatically when the slats are lowered to 18 degrees minimum (lever in position 1 minimum i.e. slats not in) or NLG is on ground. Then, the logo lights come on automatically during taxiing, takeoff, climb, approach, landing and on ground phases.
- OFF: the logo lights stay off.

Operation
The position of the LOGO toggle switch is first sent to the CPIOMs which host the ELCO software. The ELCO software processes the toggle-switch status data in relation to other A/C data (slat position from SFCC and L/G status from LGERS). Then, the ELCO software controls the logo lights through EPDC 1 or EPDC 2 and SPDBs.


LOGO LIGHTS-LH
POWER SUPPLY UNIT
HID LIGHT TECHNOLOGY
EXT LT
STROBE ON
BEACON ON
NAV
LOGO ON
AUTO
OFF
WING ON
LDG ON
NOSE T.O
TAXI
POWER SUPPLY UNIT
CPIOM
ELCO
AFDX NETWORK
EPDC
SPDB
SFCC
SLATS EXTENDED
LGERS
NLG ON GROUND
HID: High Intensity Discharge
LOGO LIGHTS-RH

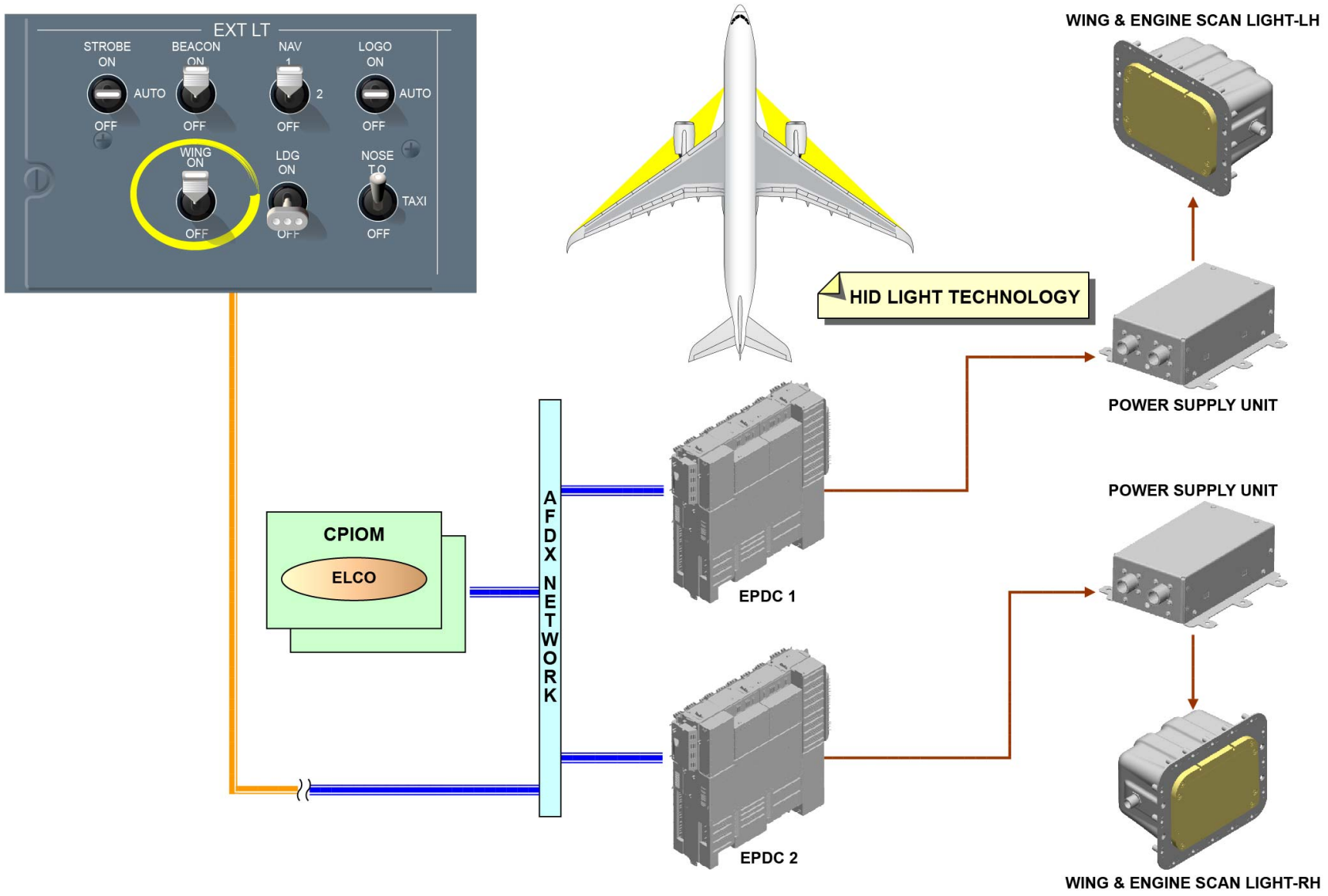
LOGO LIGHTS

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Wing and Engine Scan Lights

The wing and engine scan lights are used by the flight crew members to monitor formation of ice on the wing leading edge and on the engine intake.
There are two wing and engine scan lights.
On the FWD fuselage, the system has:
- One left wing and engine scan light (bi-function)
- One right wing and engine scan light (bi-function).

These lights use the HID technology.
The two wing and engine scan lights are connected to a different PSU.
These PSUs are supplied with 115VAC from EPDC 1 or EPDC 2.
The WING toggle switch on the EXT LT control panel controls the wing and engine scan lights with ON and OFF positions.
The wing and engine scan lights are on when the WING toggle switch is set to the ON position and they are off if this switch is set to the OFF position.
Operation
The position of the WING toggle switch is first sent (through the CRDCs and AFDX network) to the CPIOMs which host the ELCO software. The ELCO software processes the toggle-switch status data. Then, the ELCO software controls the wing and engine scan lights (on or off) through EPDC 1 or EPDC 2 that supplies 115VAC to the PSUs.



WING AND ENGINE SCAN LIGHTS

V1813401 - V01T0M0 - VM33D5EXTL03001

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

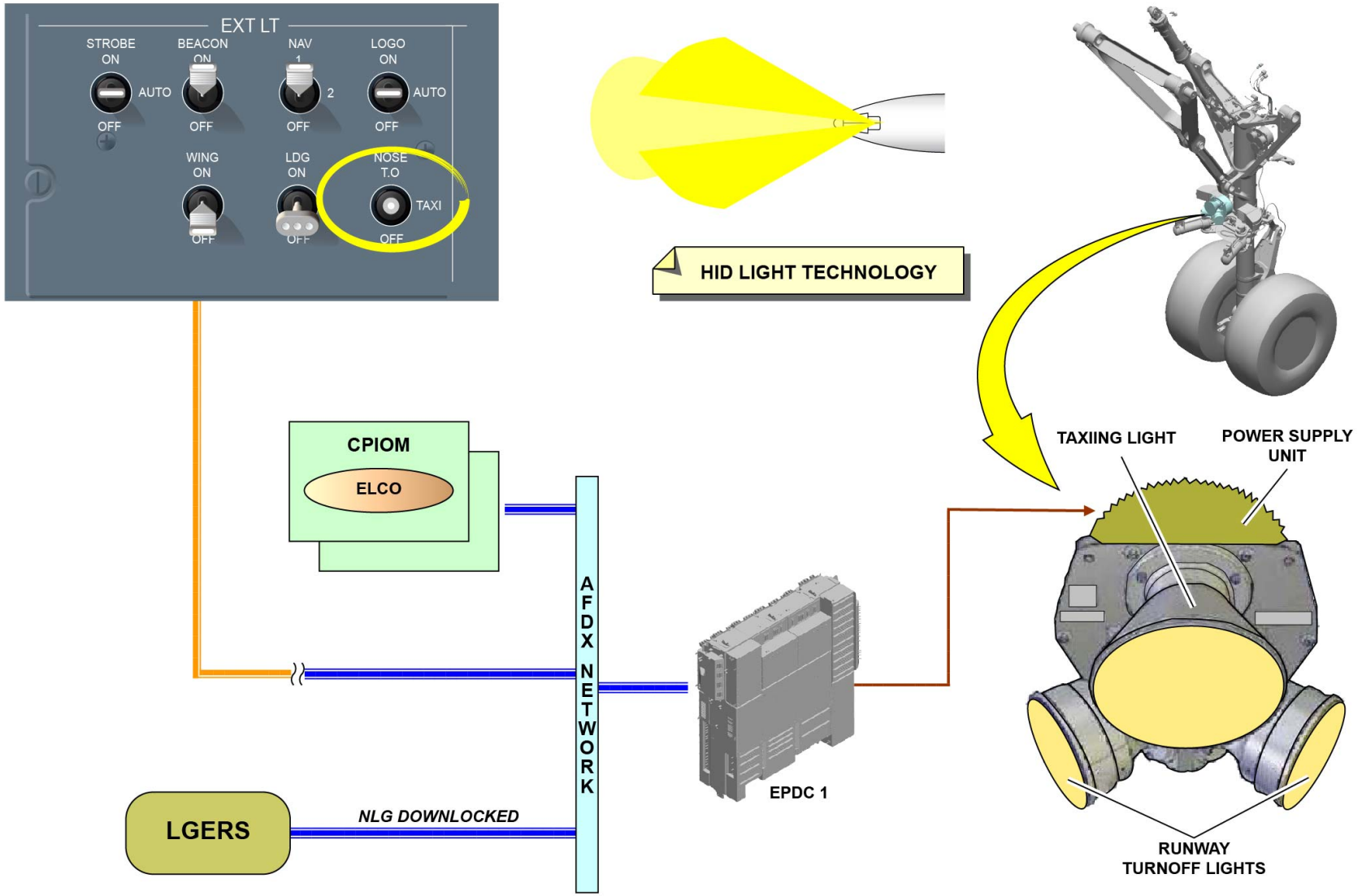
Runway Turnoff and Taxiing Lights

The runway turnoff and taxiing lights give sufficient illumination on ground during the taxiing phase (in conjunction with the RH takeoff lights). The runway turnoff and taxiing lights are also used with the landing lights and takeoff lights during takeoff and landing phases.
The runway turnoff and taxiing lights are installed in a same assembly that includes:
- Three optical modules (one for the taxi light and two for the runway turnoff lights) with three HID lamps (one for each optical module)
- A common integrated PSU.

A three-way NOSE toggle switch on the EXT LT panel controls the runway turnoff and taxiing lights.
When the NOSE toggle switch is set to:
- OFF: the runway turnoff and taxiing lights are off
- TAXI: the runway turnoff and taxiing lights are on
- T.O: the runway turnoff and taxiing lights and takeoff lights are on.

Note that the lights can be switched on only when the NLG is downlocked.
The runway turnoff and taxiing lights automatically go off as soon as the A/C is in-flight with NLG uplocked, if the NOSE toggle switch is set to the TAXI or T.O position.
Operation
The position of the NOSE toggle switch is first sent to the CPIOMs wich host the ELCO software. The ELCO software processes the toggle-switch status data in relation to other A/C data (NLG status from the LGERS). Then, the ELCO software controls the runway turnoff and taxiing lights (on or off) through EPDC 1 that supplies 115VAC to the common integrated PSU.

V1813401 - V01T0M0 - VM33D5EXTL03001



RUNWAY TURNOFF AND TAXIING LIGHTS

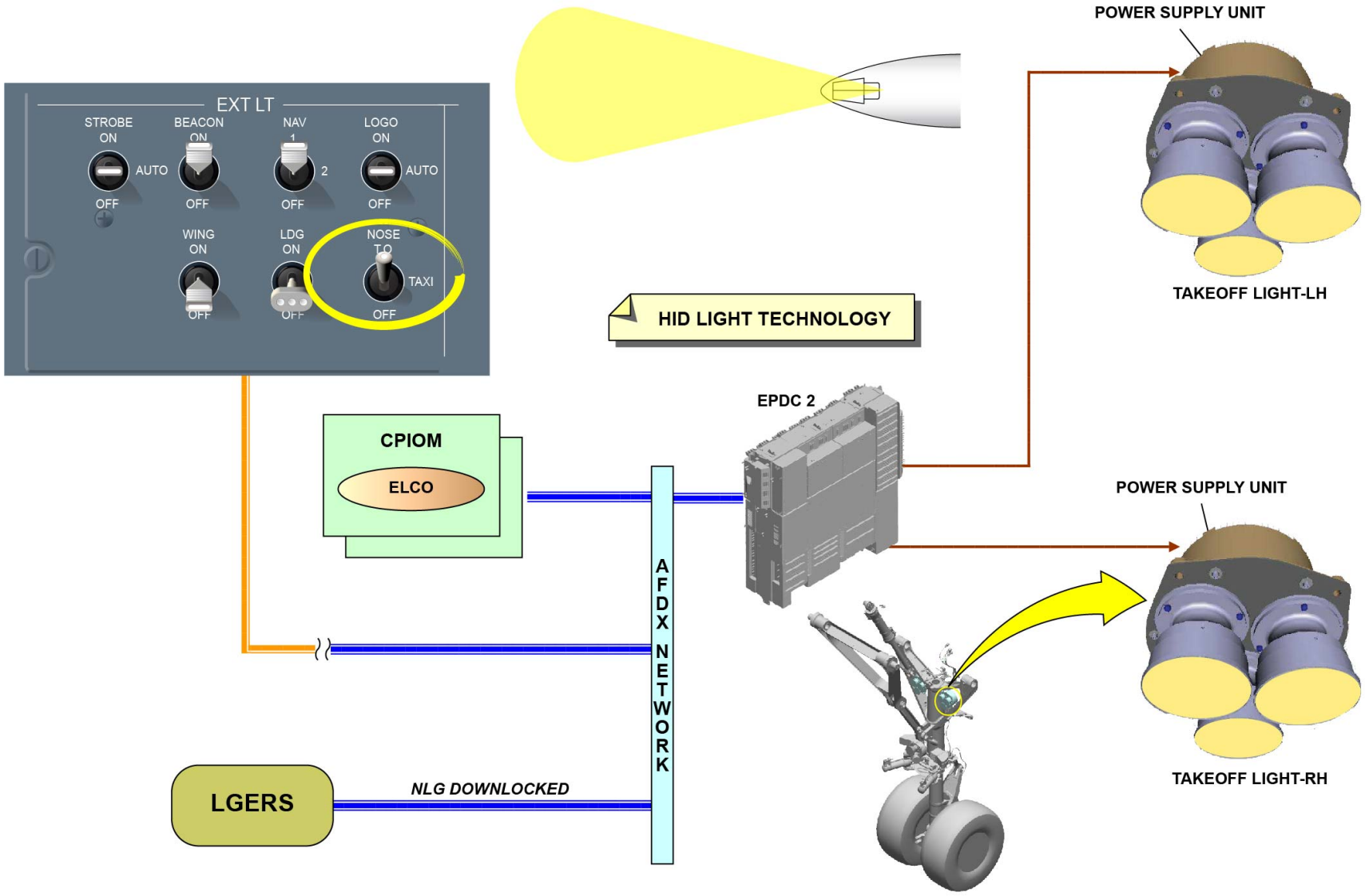
EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Takeoff Lights

The takeoff lights illuminate the ground to clearly identify the runway during takeoff and ground roll at night.
The A/C is installed with two takeoff light assemblies on the NLG leg.
Each takeoff light assembly includes:
- Three optical modules with three HID lamps (one for each optical module)
- A common integrated PSU.

The three-way NOSE toggle switch on the EXT LT control panel controls the taxi and takeoff lights:
- OFF: the runway turnoff and taxiing lights and takeoff lights are off.
- TAXI: the runway turnoff and taxiing lights are on.
- T.O: the runway turnoff and taxiing lights and takeoff lights are on.

Note that the takeoff lights can operate only when the NLG is downlocked. The takeoff lights automatically go off as soon as the A/C is in flight with NLG uplocked, if the NOSE toggle switch is on TAXI or T.O position.
Operation
The position of the takeoff lights toggle switch is first sent to the CPIOMs hosting the ELCO software. The ELCO software processes the switch position data in relation to other A/C data (NLG status from the LGERS). Then, the ELCO software controls the takeoff lights (on or off) through EPDC 2 that supplies 115VAC to the related PSUs.



TAKEOFF LIGHTS

V1813401 - V01T0M0 - VM33D5EXTL03001

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

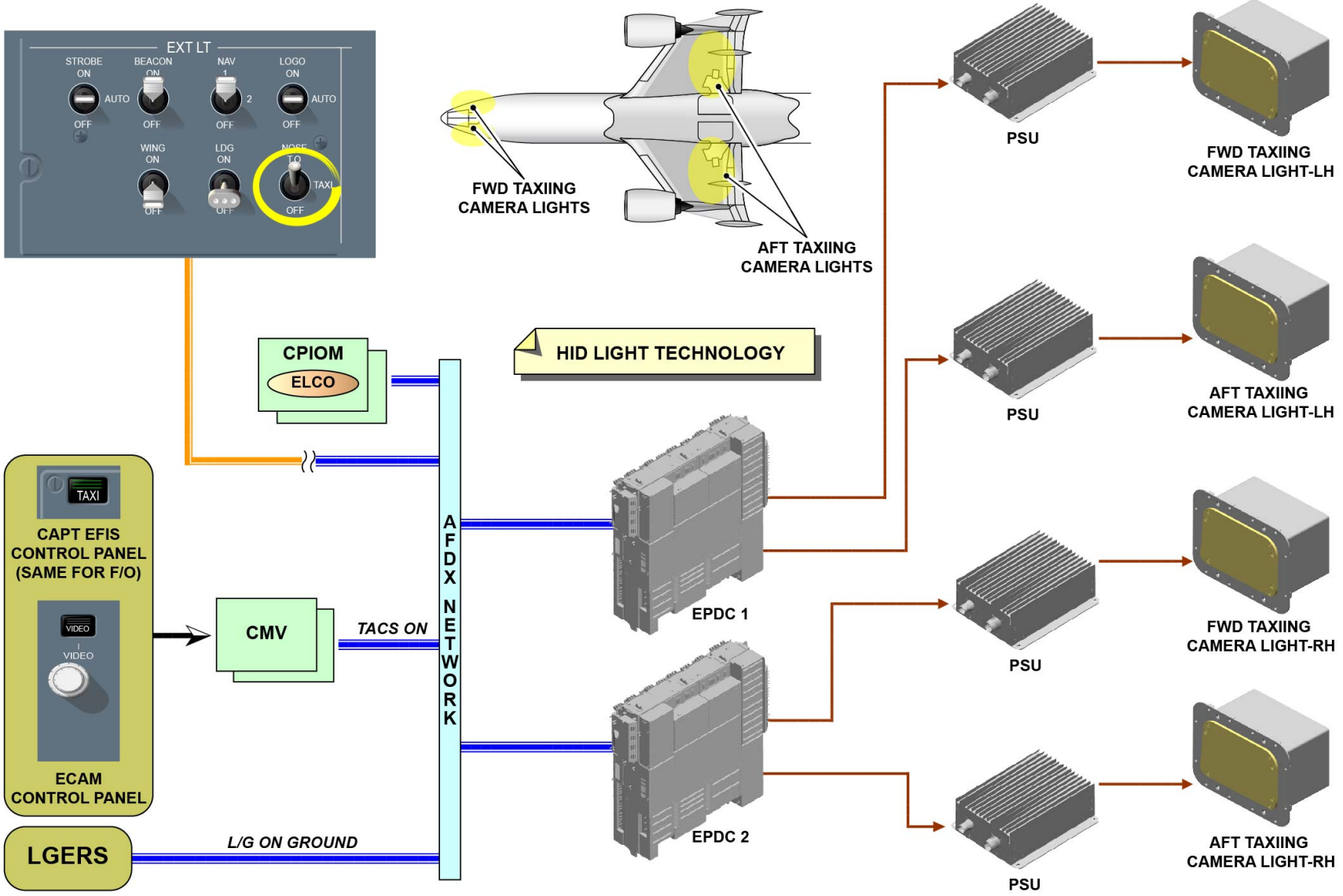
Taxiing-Aid Camera Lights

The Taxiing Aid Camera (TAC) light system supplies sufficient light to let the flight crew members see (on the cockpit displays) the position of the NLG and Main Landing Gears (MLGs) in relation to the taxiway during taxiing phases when the two TACs are set to the on position.
The taxiing-aid camera light system includes four lamps of HID type:
- Two FWD TAC lights at the bottom side of the nose fuselage (LH and RH side)
- Two aft TAC lights at the bottom side of the wings (LH and RH wings)
- Four different PSUs (each light is connected to a different PSU).

The three-way NOSE toggle switch on the EXT LT control panel controls the TAC lights through three positions: OFF, TAXI and T.O.
The TAC lights operate if:
- The NOSE toggle switch is in the T.O or TAXI position.
- The taxiing-aid camera light system is activated in the cockpit through the TAXI P/BSW on the EFIS control panel or through the VIDEO P/BSW on the ECAM control panel.
- The L/G is on ground.

Operation
The position of the NOSE toggle switch is first sent to the CPIOMs which host the ELCO software. The ELCO software processes the toggle-switch status data in relation to other A/C data (L/G status from the LGERS and the TACS ON signal from the CMVs). Then, the ELCO software controls the TAC lights (on or off) through EPDC 1 (for LH lights) and EPDC 2 (for RH lights) that supply 115VAC to the related PSUs.

V1813401 - V01T0M0 - VM33D5EXTL03001



TAXIING-AID CAMERA LIGHTS

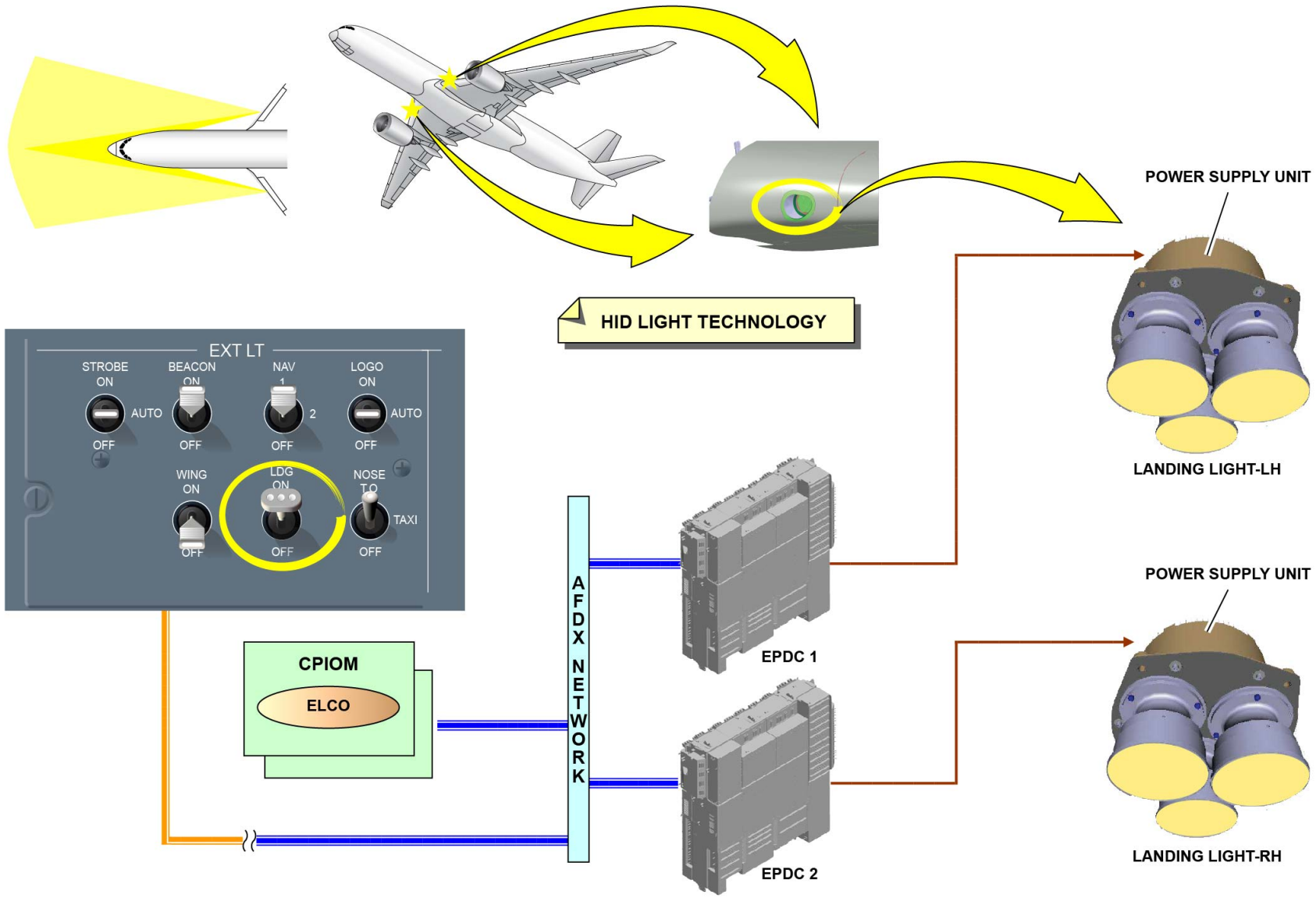
V1813401 - V01T0M0 - VM33D5EXTL03001

EXTERIOR LIGHTING SYSTEM DESCRIPTION (2/3)

Landing Lights

The landing lights give a forward lighting of the landing area when the A/C is in approach at night and/or in bad weather conditions.
The landing lights system has two landing light assemblies installed in each wing root on the inboard leading edge.
Each landing light assembly contains:
- Three optical heads with three HID lamps (one for each optical head)
- A common integrated PSU.

The LDG toggle switch on the EXT LT control panel controls the landing lights with ON and OFF positions.
Operation
The position of the LDG toggle switch is first sent to the CPIOMs which host the ELCO software. The ELCO software processes the toggle-switch status data. Then, the ELCO software controls the landing lights (on or off) through EPDC 1 (for LH lights) and EPDC 2 (for RH lights) that supply 115VAC to the related PSUs.



LANDING LIGHTS

V1813401 - V01T0M0 - VM33D5EXTL03001

LIGHTING SYSTEM MAINTENANCE (2/3)

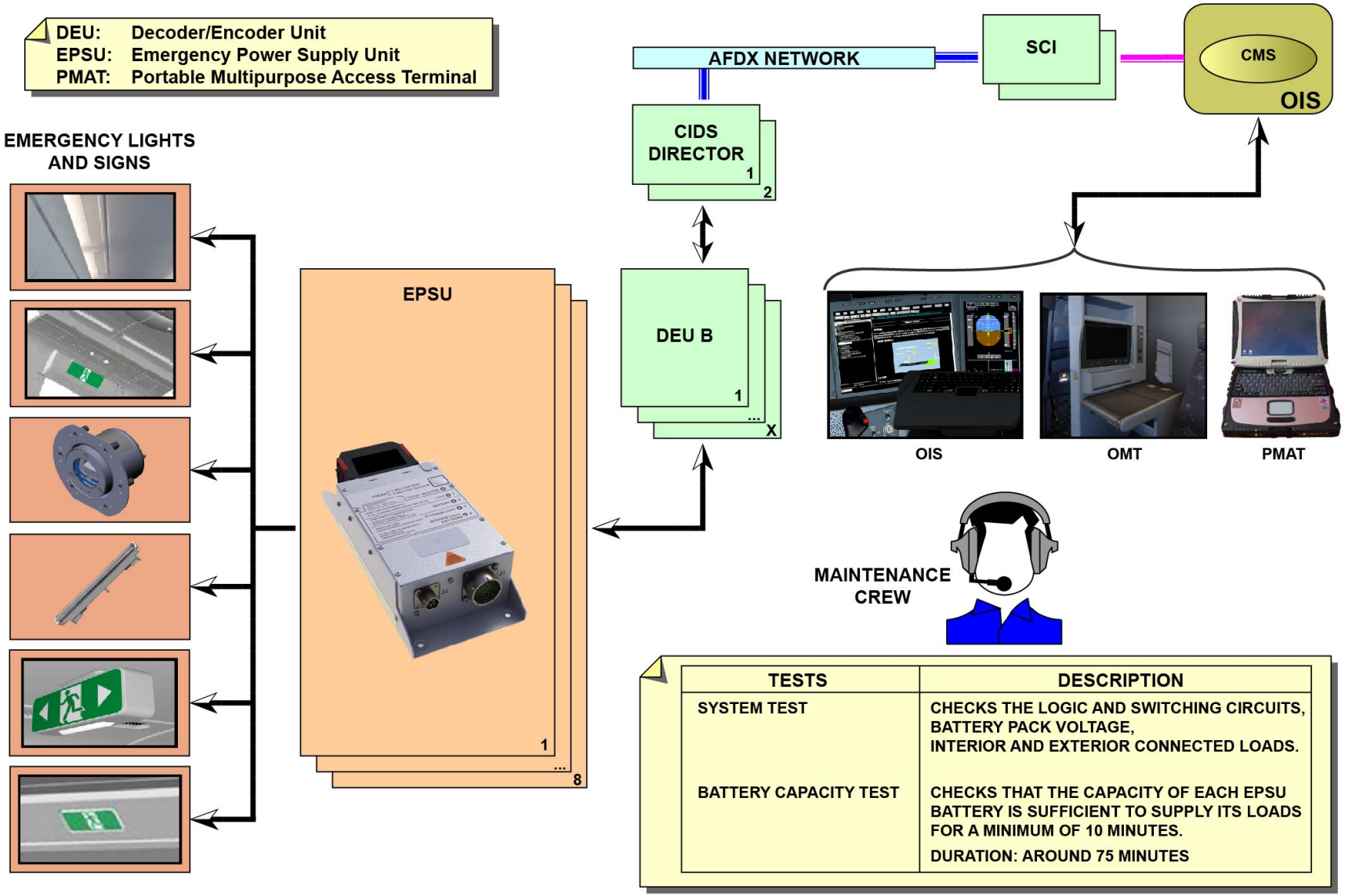
Emergency Lighting Tests from OMS Interface

The interactive emergency-lighting tests are done from the CMS and through the CIDS. These tests are launched from the OMS HMIs (Human-Machine Interfaces) (i.e.: OMT, Portable Multipurpose Access Terminal (PMAT) or CDS) trough the System/Report Test menu of ATA 33:

- The system test checks the condition of the electronic circuits and battery pack voltage of all the Emergency Power Supply Units (EPSUs) with their connected electrical loads.
- The battery capacity test monitors that the capacity of each EPSU battery is sufficient to supply its loads for a minimum of 10 minutes. Around 75 minutes are necessary for the battery capacity check to be completed.

The CMS, which is hosted in the OIS, is connected to the EPSUs through the SCIs, the CIDS directors and the Decoder/Encoder Units B (DEUs B) to get the System/Report Test functions for the emergency lighting system.

V1813401 - V01T0M0 - VM33M1MAINT3001



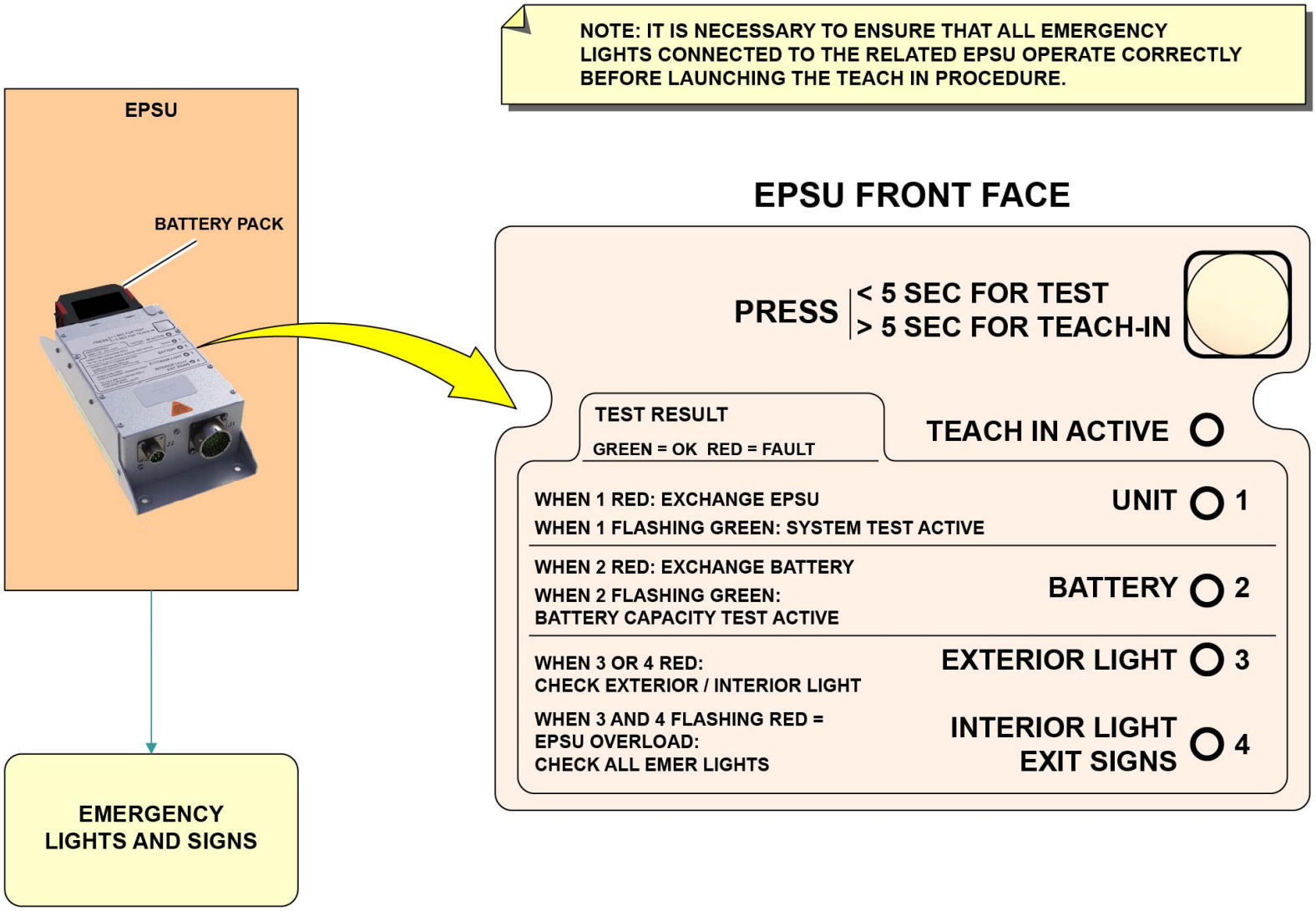
EMERGENCY LIGHTING TESTS FROM OMS INTERFACE

LIGHTING SYSTEM MAINTENANCE (2/3)

EPSU Individual Local Test

The EPSU individual test and the TEACH IN procedure can be launched with an EPSU front-face pushbutton.
The EPSU individual test (pushbutton pushed < 5 sec).
An individual test of each EPSU with its battery pack and its connected emergency lights can be done with a test pushbutton located on the front face of each EPSU. The test results are shown directly on the EPSUs thanks to the LEDs status.
There are some LEDs on the EPSUs to show the failure or the good condition of:
- The EPSU UNIT
- The BATTERY pack
- The connected EXTERIOR emergency light (evacuation area lights)
- The connected INTERIOR lights and EXIT SIGNS.

The TEACH IN procedure (pushbutton pushed > 5 sec.)
A load programming procedure is automatically done when a new EPSU battery or when a new EPSU is installed. Whis this procedure, called TEACH IN procedure, you can measure and keep the load value of the related EPSU in the EPSU memory. This load value corresponds to the current value given by the EPSU during the procedure to supply all the connected emergency lights and signs.
This load value is used as reference value during an OMS system test or during an EPSU individual test to find the failure of a light or an overload condition (because of a short circuit). The TEACH IN procedure can be manually started (e.g. after a light replacement) through a pushbutton located on the front face of the EPSU.
Note that it is necessary to make sure that all the emergency lights connected to the related EPSU operate correctly before the launch of the TEACH IN procedure.



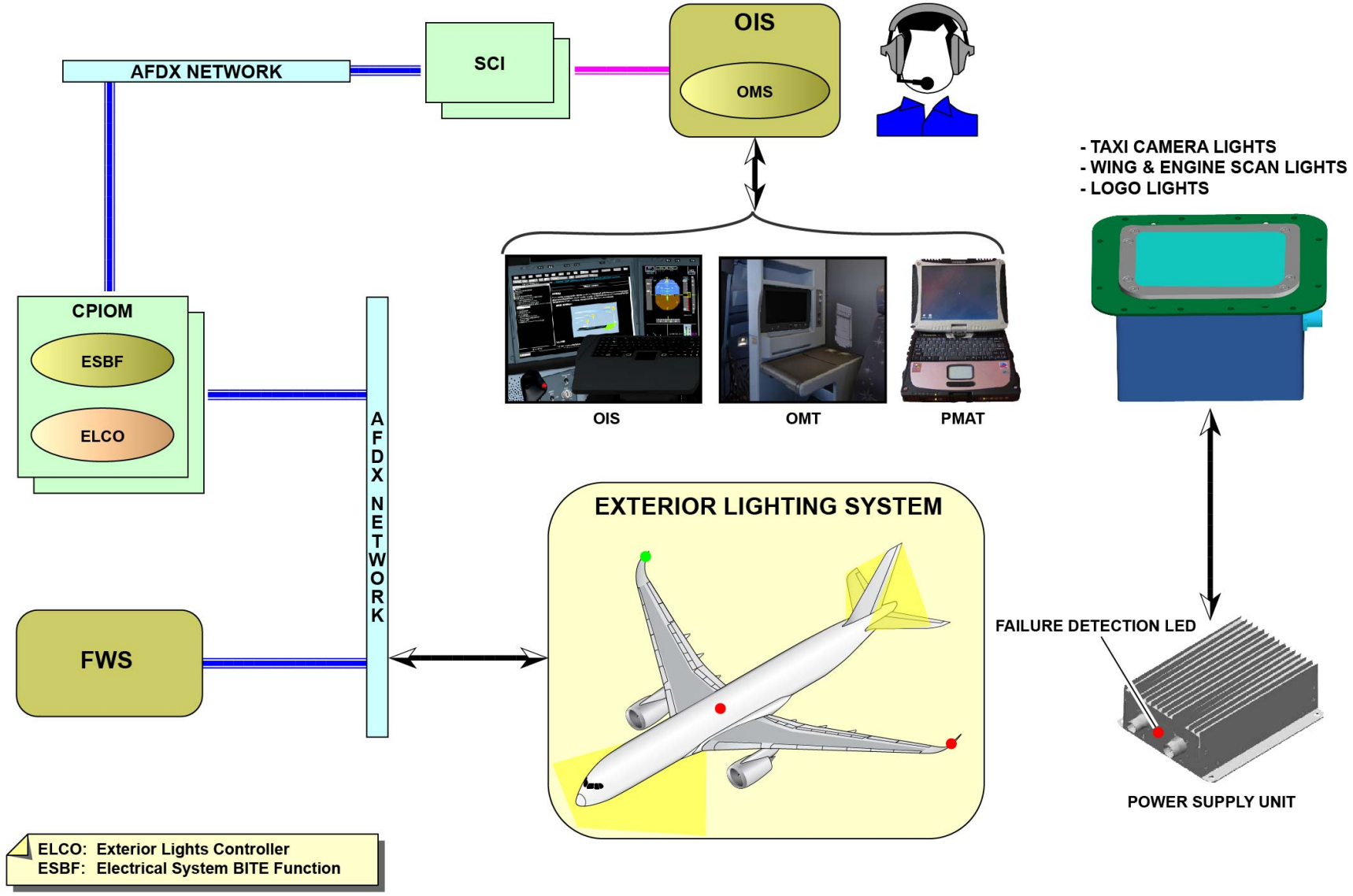
EPSU INDIVIDUAL LOCAL TEST

V1813401 - V01T0M0 - VM33M1MAINT3001

LIGHTING SYSTEM MAINTENANCE (2/3)

Exterior Lighting Maintenance

The software of the Exterior Lights Controller (ELCO) is connected to the FWS (for memo, warnings and dispatch advisory generation) and to the ACMS (to support the Trouble Shooting Manual (TSM) and Aircraft Maintenance Manual (AMM) activities on the A/C) to improve the monitoring, the maintenance and the troubleshooting of the exterior lighting system.
The ELCO software also has a BITE function (Electrical System BITE Function (ESBF)) that can give the report of the failure of one Line Replaceable Unit (LRU) to the CMS. In this case, the ESBF generates a special failure message.
Moreover, there are some of the Power Supply Units (PSUs) of the exterior lights installed with a LED that gives an indication about their power supply status, to improve the failure diagnosis.
If there is an exterior light failure and the LED is on, the power supply operates correctly and so the lamp must be defective. But, if there is an exterior light failure and the LED is off, the failure must be related to the PSU.
The PSUs of the following exterior lights are installed with this LED:
- Taxi camera lights
- Wing and engine scan lights
- Logo lights.



EXTERIOR LIGHTING MAINTENANCE

LIGHTING SYSTEM MAINTENANCE (2/3)

ACMS Exterior Lighting Maintenance

The ACMS exterior-lights system pages can be used to support the exterior lights AMM/TSM activities on the A/C.
These ACMS functions can give real-time system pages for all the exterior lights:
1 NAVIGATION data from navigation lights
2 ANTI COLLISION data from beacon and strobe lights
3 NOSE data from takeoff and taxi and runway turnoff lights
4 LANDING data from landing lights
5 WING and ENGINE data from wing and engine lights
6 LOGO data from logo lights
7 TAXI CAMERA data from taxi camera lights.
For each light component, there are the following data:
- Functional Item Number (FIN)
- Elapsed time
- Remaining time (estimated)
- Life Reached time (estimated)
- Real time Consumption.

The Remaining time is a theoretical value that is given by the light supplier. The maximum value of the Remaining time is equivalent to the value of the Mean Time Between Failures (MTBF) of the light component. This value is given in hours. When there is no more remaining time (Remaining time counter is zero), a light replacement can be planned, but it stays the decision of the pilot to report if the light performance is satisfactory or not.
The Life Reached time is linked to the light luminosity performance. The supplier gives a theoretical value in hours under which the performance of the light is supposed to fall below the light luminosity performance requirement.
When the threshold is reached, an amber YES is shown on the ACMS area of the light. The light replacement can be planned.
If the threshold of the Life Reached time is not reached, a green NO is shown on the ACMS area of the light.
In addition, for the navigation, strobe and beacon lights, when the threshold of the Life Reached time is reached, a special dispatch message is triggered and the light must be replaced.
For the other exterior lights, the status of the Life Reached time (YES or NO) is given, but no dispatch message is triggered.

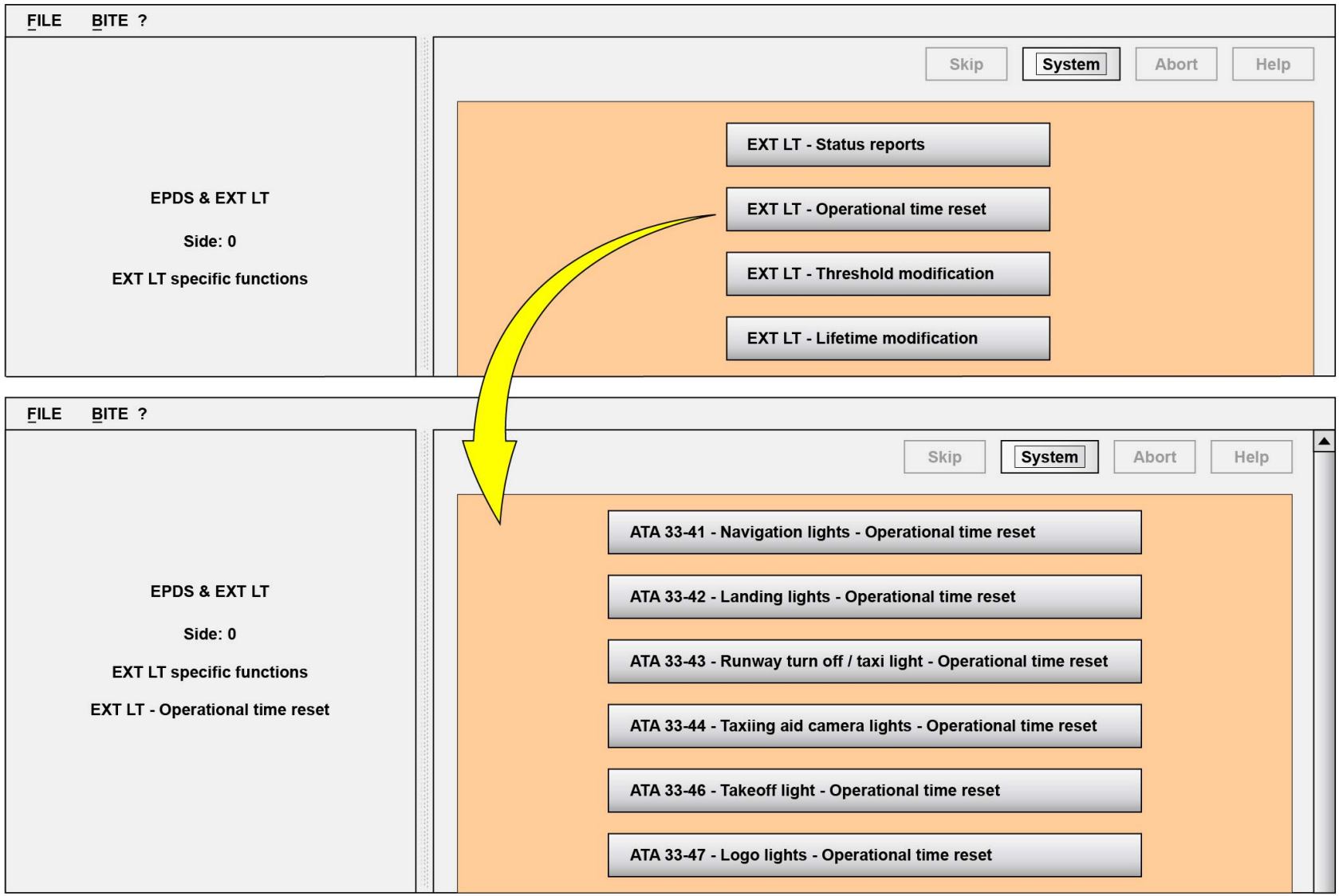
EXAMPLE OF LAYOUT OF THE EXTERIOR-LIGHTS SYSTEM PAGE FOR NAVIGATION LIGHTS

ACMS EXTERIOR LIGHTING MAINTENANCE

LIGHTING SYSTEM MAINTENANCE (2/3)

CMS Exterior Lighting Maintenance

The exterior light system has a special CMS menu.
This menu is accessible from the EPDS and EXT LT menu through the System/Report Test menu of ATA 33. It gives access to the EXT LT test functions and EXT LT specific functions.
After the removal/installation of a light component, the Operational time menu gives the approval for the resetting to zero of the elapsed time counter and for the reinitialization of the remaining time and the end of life of the counters.
It is also possible to change the component Lifetime value and the Threshold value in relation to the light supplier recommendations.



CMS EXTERIOR LIGHTING MAINTENANCE

LIGHTING SYSTEM CONTROL AND INDICATING (2/3)

Cabin Lighting (2/3)

This Control / Indicating module provides a general presentation of the Cabin Lighting control through the MP-FAP.
On the MP-FAP Hard Key panel:
MAIN ON/OFF P/B: for Maintenance purpose and on ground only, this push-button allows to switch ON at 100 % all the Cabin lights (general & Entries & Galley & lavatories Lightings) and all the Reading Lights & Attendant Work Lights.
LAV MAINT P/B: for Cleaning and Maintenance purposes and on ground only, this push-button allows to switch ON at 100 % all the Cabin lavatory lightings.
On the MP-FAP touch screen:
CABIN STATUS page: this page provides an overall status of the Cabin. This page allows direct access to the 5 system pages: LIGHTS, TEMPERATURE, DOORS/SLIDES, WATER/WASTE, SMOKE DETECTION.
LIGHTS page: this page mainly allows to control the general illumination in the different areas of the cabin.
It is possible either to adjust manually the lighting (fine tuning control) or to call a predefined scenario (Cruise, Dinner....) for the following areas:
- Zones (First Class, Business class, Economy class, Tourist class),
- Rooms (FWD Galley, AFT Galley, FCRC, CCRC...),
- Entries (Door 1, Door 2, Door 3, Door 4),

The "Aircraft-wide Adjustment" area (in the Lights page) gives access to the following functions:
- General Lights function. This mode allows the selection of Night Mode, MAIN ON/OFF function (available on ground only), and Reading Lights general control (Available on ground only).
- Entire Scenario. This mode allows to call a predefined scenario, which will apply to the whole cabin.
- Light Strips function to switch on independently the Windows light strips, the Center light strips, or the Aisle light strips.

LIGHTS PRESET page: this page allows to call and load a predefined scenario, which may apply for the whole flight and within the whole cabin.
CABIN LIGHT PROGRAMMING page allows to program and save within the CIDS a lighting scenario. These lighting scenarios can also be loaded via the CAM (Cabin Assignment Module) within the CIDS memory.
These programmed scenarios, which apply for a whole flight and within the whole cabin, can be called via the LIGHTS PRESET page.
The Reading Lights page (accessible via the SEAT SETTING page) allows to Switch ON / OFF individually all passenger Reading Lights in all flight phases (if programmed within the CAM).

Emergency Lighting (2)

This Control / Indicating module provides a general presentation of the Emergency Lighting.
The Emergency Lighting system can be activated and controlled by the flight crew from the "ON - ARM - OFF" EMER LT switch located in the cockpit on the SIGNS panel.
When the switch is selected to the "ON" position, all emergency lights in the aircraft will turn ON.
When the switch is selected to the "OFF" position, the emergency lighting system is disabled. This condition is confirmed by an amber "OFF" indication below the EMER LT switch.
With the switch in "ARM" position, the emergency lighting system will be activated automatically. For example in case of loss of 115 VAC NORMAL and/or 28 V DC Non-Essential, all Emergency lights are switched on automatically.
The Emergency Lighting system can be activated and controlled by the cabin crew from the EMER push-button on the MP-FAP.
By selecting ON this EMER P/B, all emergency lights in the aircraft will turn ON.

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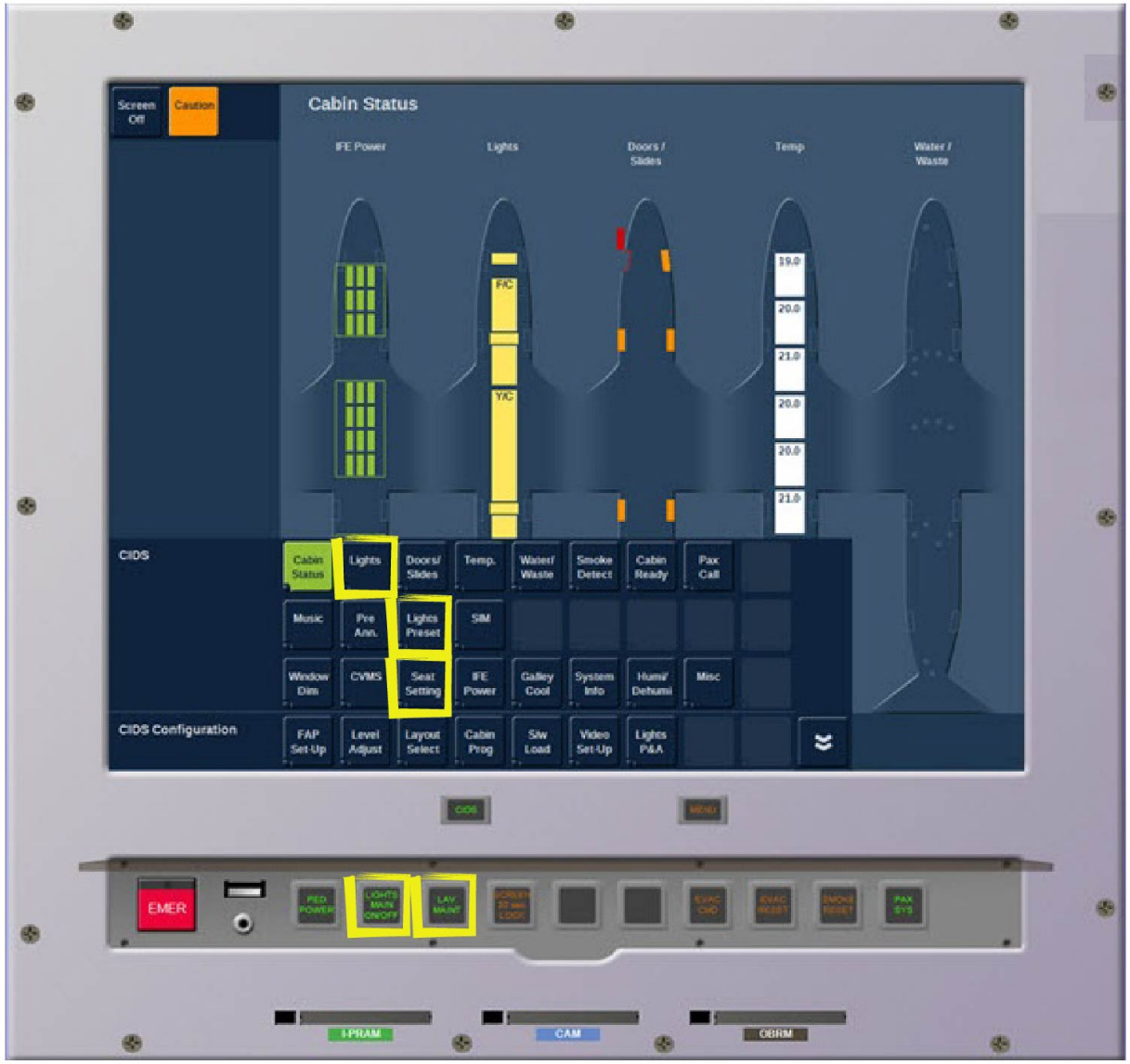
CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

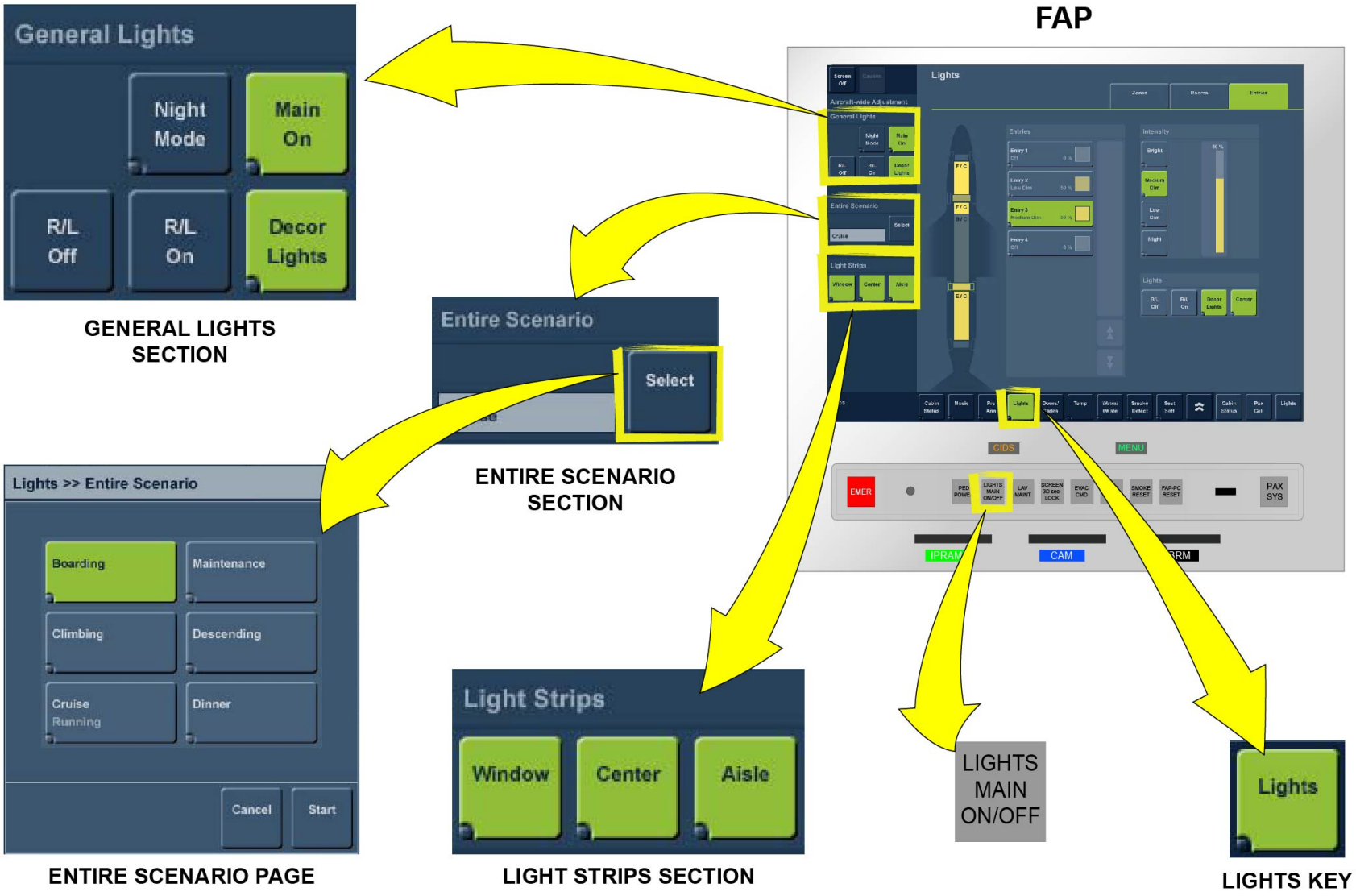


CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

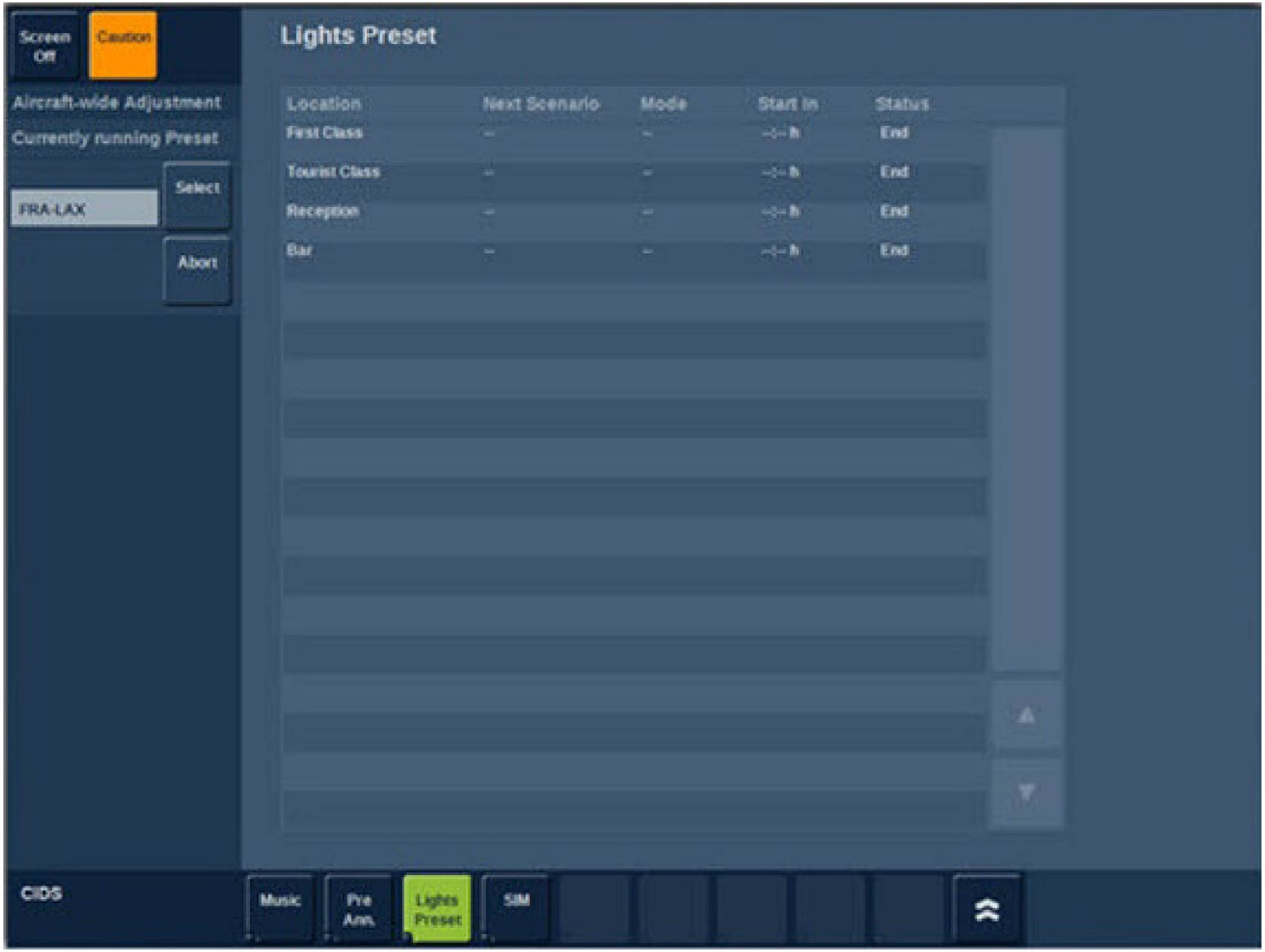
CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

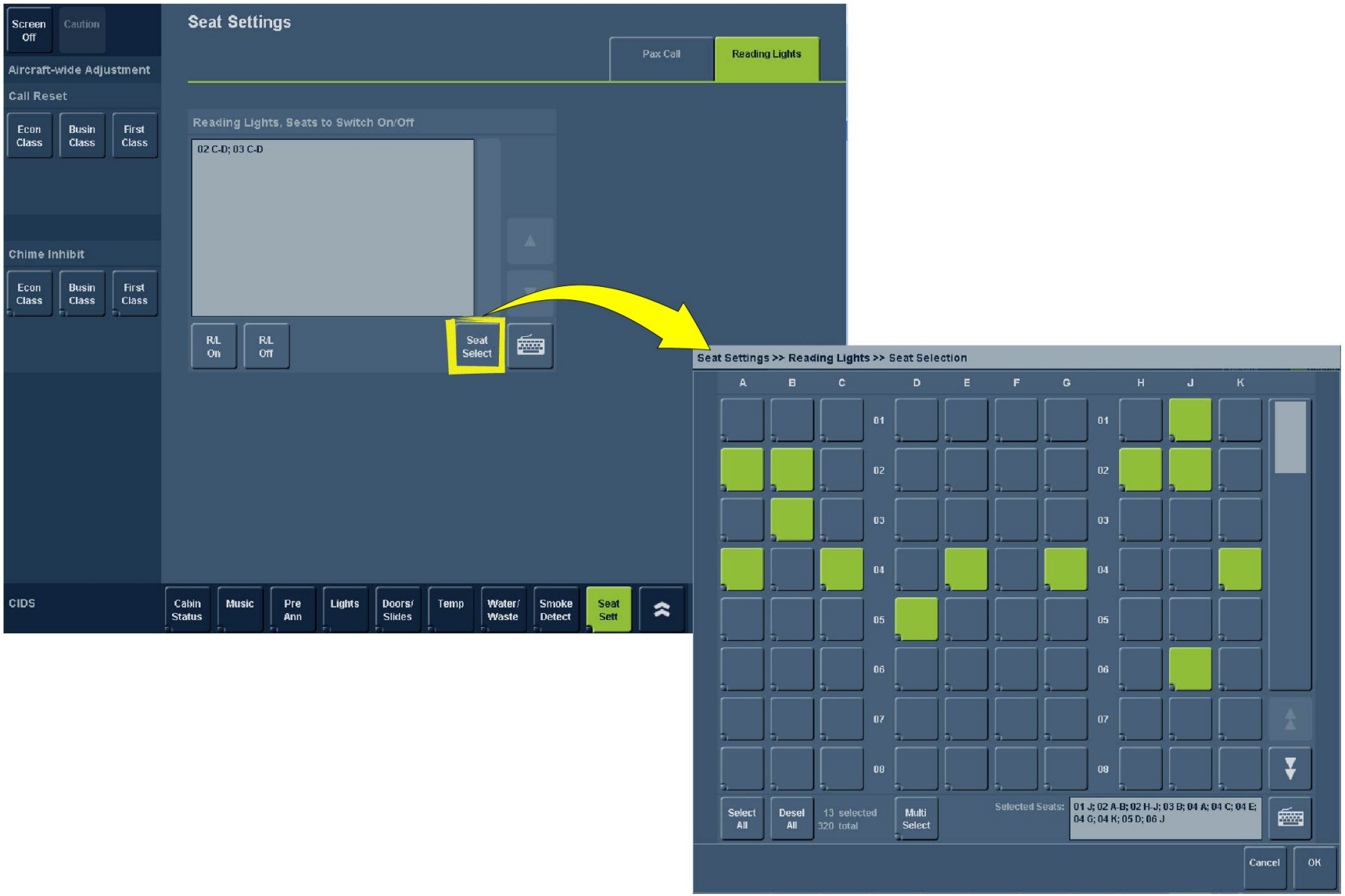
CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)



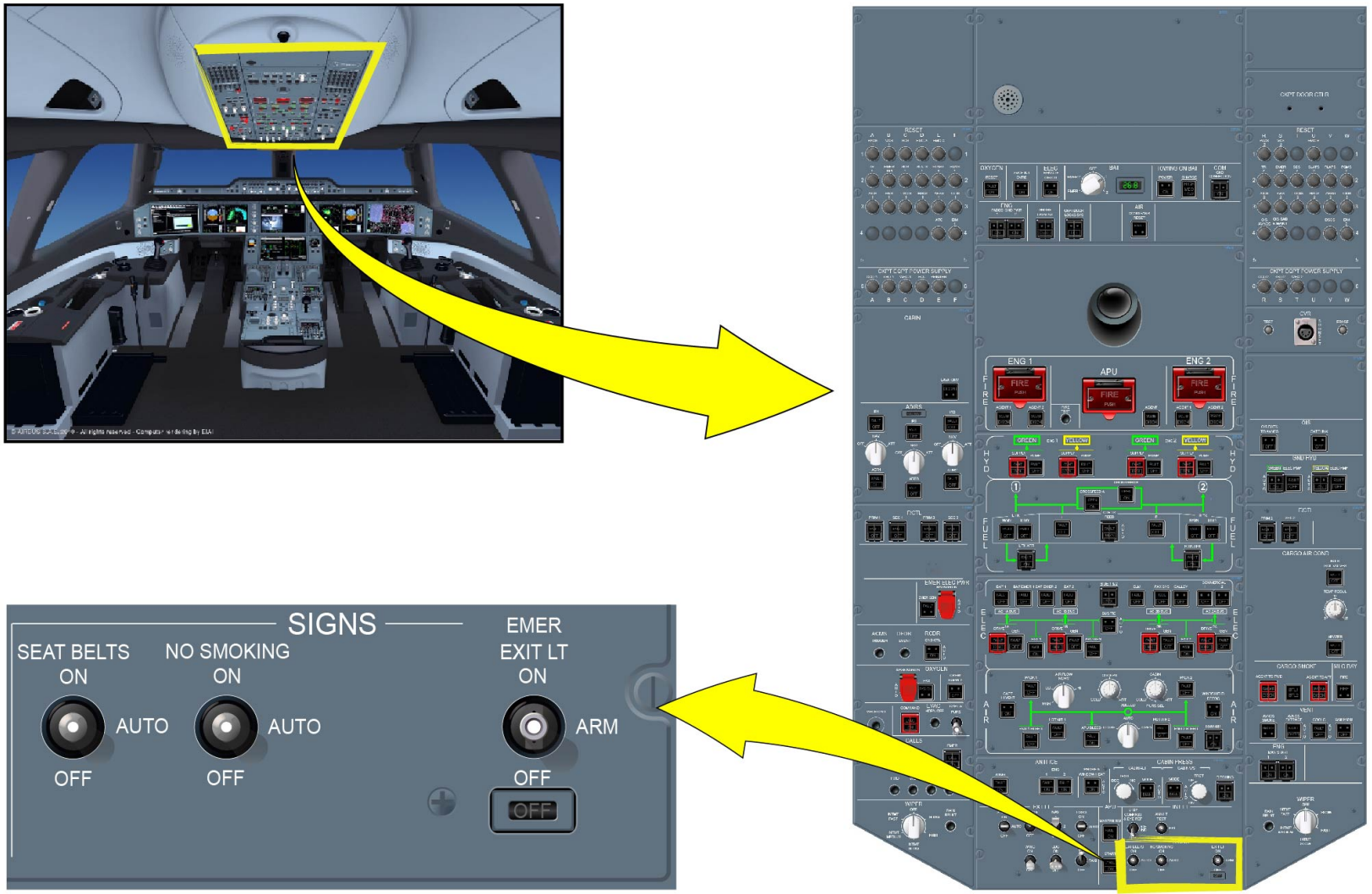
CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)



CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)



CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)



CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

CABIN LIGHTING (2/3) & EMERGENCY LIGHTING (2)

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