Zhaga-D4i standards for smart luminaires

Digital Illumination Interface Alliance
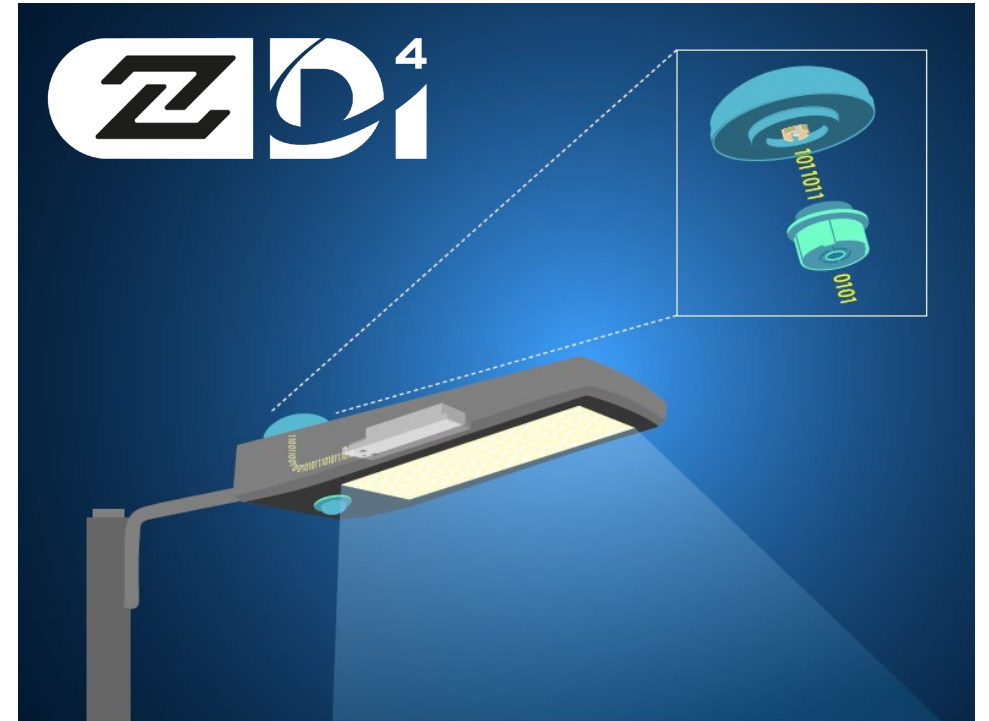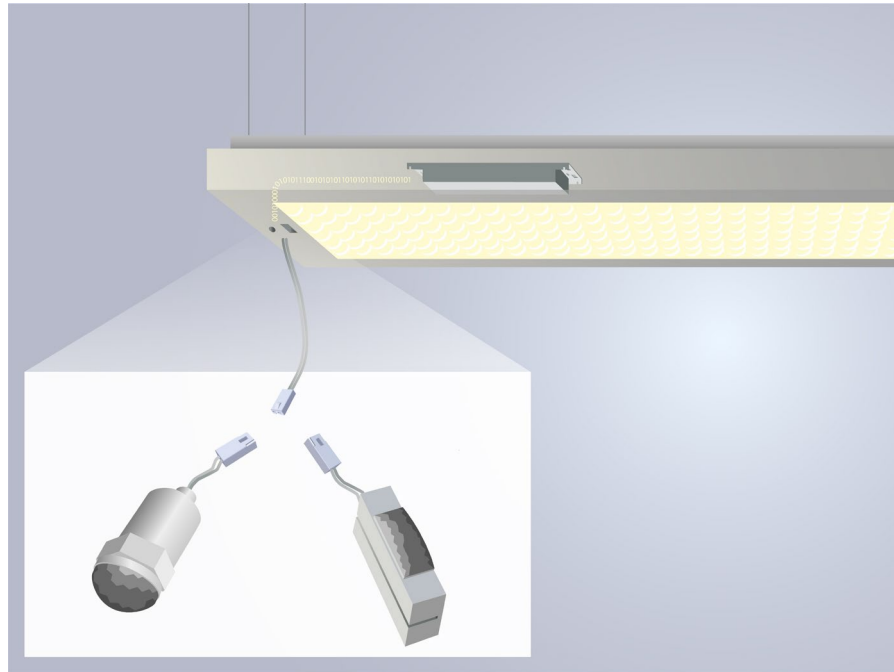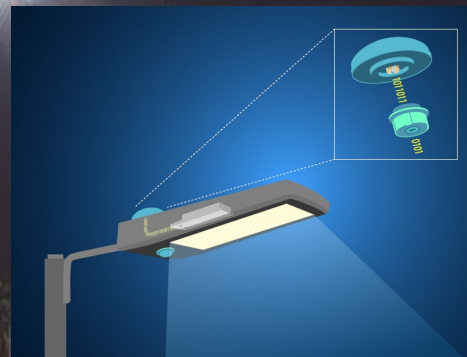
ZHAGA Consortium

Smart, future-proof LED luminaires with IoT connectivity

Connected: Able to participate in the IoT

Future-proof: Easily upgraded to keep pace with rapid developments in digital networking technology

Standardized: Certified solutions with plug-and-play interoperability

Beyond lighting: Supporting sensing and communication applications

Intelligent: Able to collect and report a wide variety of data
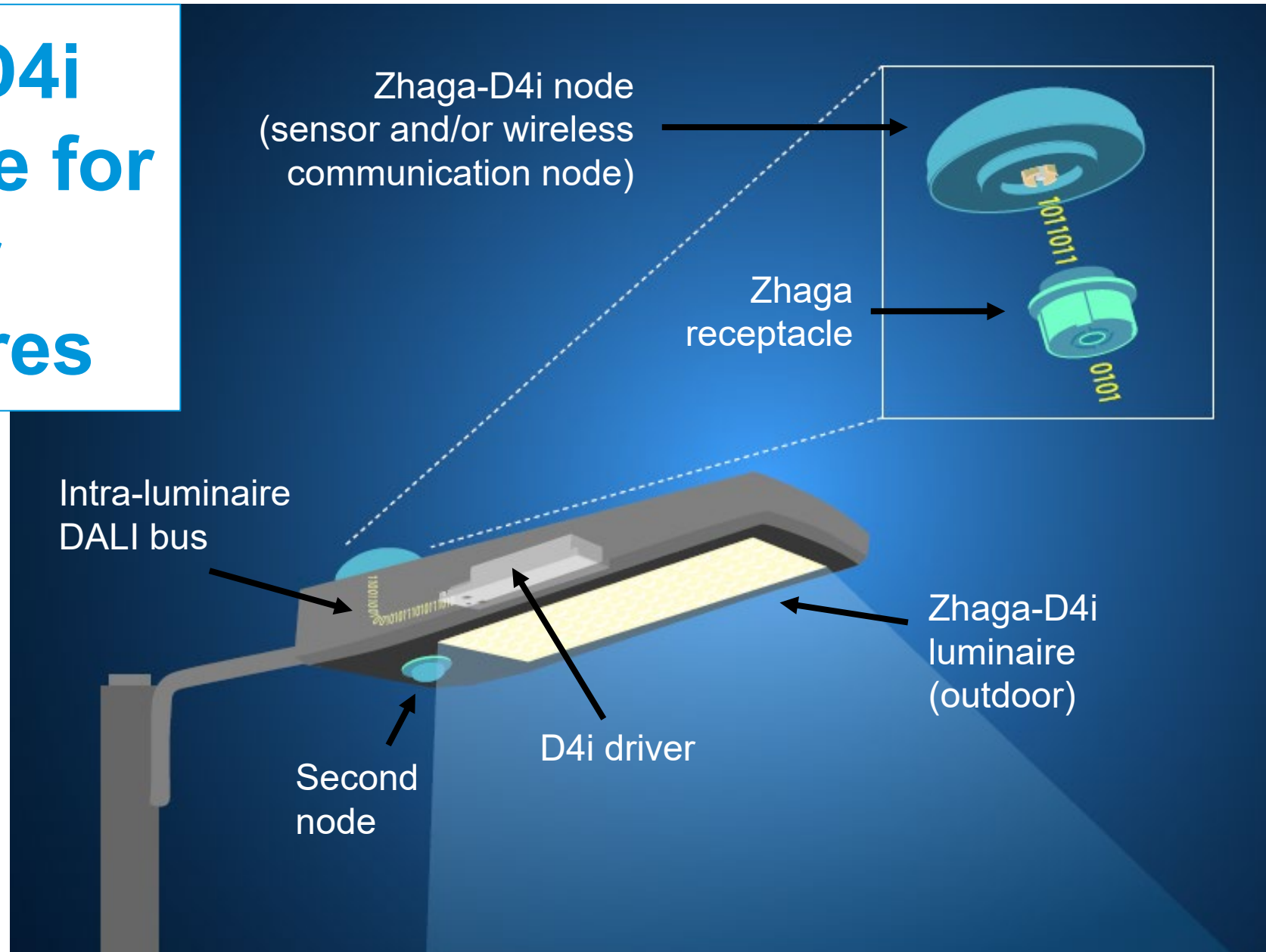
Overview – market drivers and solution

Market requirement: Smart, future-proof LED luminaires with IoT connectivity

Solution: The **Zhaga-D4i interface standard**

    → A simple way to add sensors and/or wireless communication nodes to luminaires, with plug-and-play interoperability

- Zhaga and DiiA have collaborated to develop a standardized interface between luminaires and sensors and/or communication nodes:
  – Combining complementary specifications for mechanical fit, digital communication and power
  – Offering Zhaga-D4i certification to ensure plug-and-play interoperability
  – Focusing initially on outdoor lighting, with indoor being a work-in-progress

Digital Illumination
Interface Alliance

ZHAGA
Consortium

Zhaga-D4i interface for outdoor luminaires

Zhaga-D4i node
(sensor and/or wireless
communication node)

Zhaga
receptacle

Intra-luminaire
DALI bus

Zhaga-D4i
luminaire
(outdoor)

D4i driver

Second
node

Digital Illumination
Interface Alliance

ZHAGA
Consortium

Features of Zhaga-D4i interface standard

- Easy to add or upgrade sensors and/or communication nodes:
  - Enables future-proof luminaires that can keep pace with rapid developments in digital networking and sensing technology.

- Intra-luminaire DALI-2 bus:
  - Enables bi-directional interaction between sensors and/or communication nodes and LED drivers using the well-established and standardized DALI protocol.

- D4i drivers are smart:
  - Able to report operational and diagnostic data to an external network, and can provide inventory-related information about the luminaires.

- IoT connectivity:
  - With a suitable wireless communication node, the luminaire is able to interact with an external lighting-control network, and to participate in the IoT.

Digital Illumination
Interface Alliance

ZHAGA
Consortium

Complementary specifications

D4i specifications from DiiA

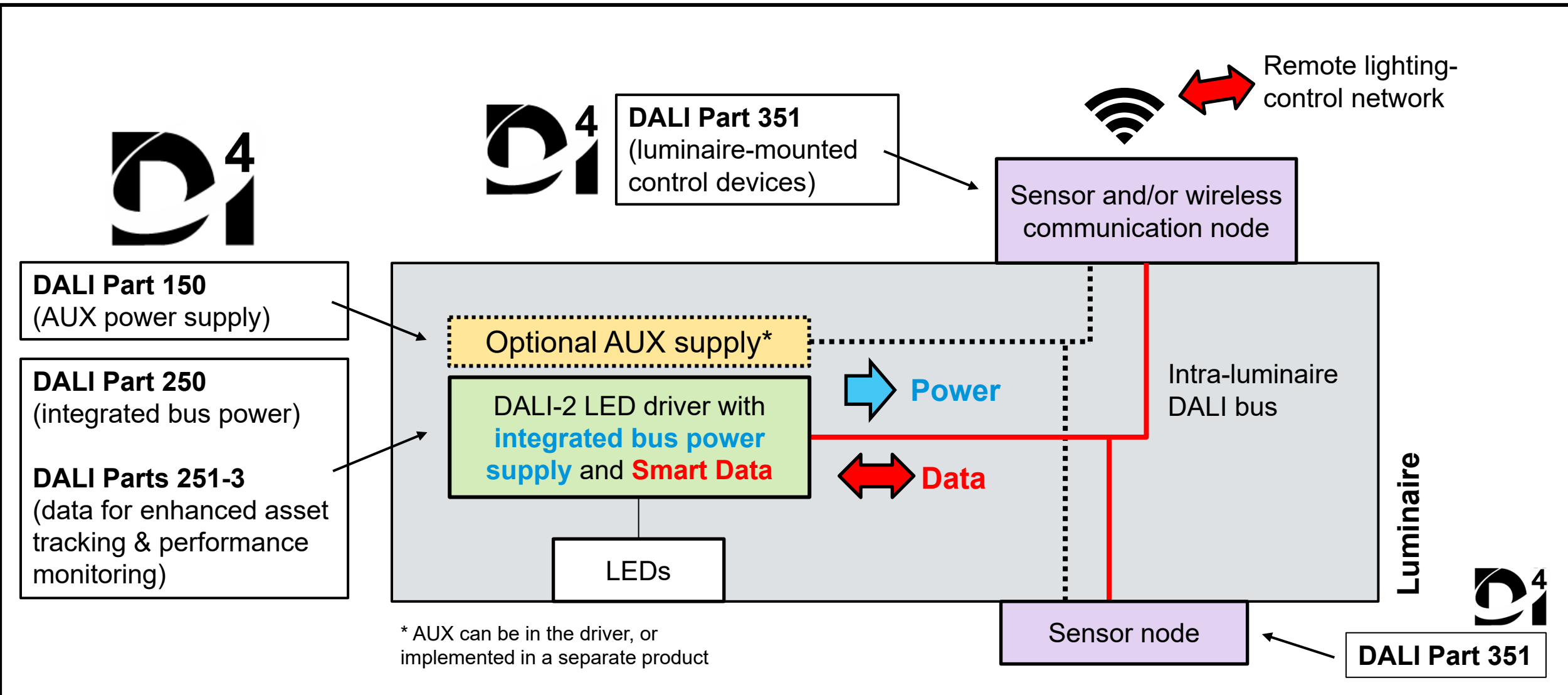**Book 18 & Book 20 specifications from Zhaga**

DALI Part 250: Integrated bus power supply
DALI Part 251: Luminaire data
DALI Part 252: Energy data
DALI Part 253: Diagnostics data
DALI Part 351: Luminaire-mounted control devices
DALI Part 150: AUX power supply
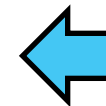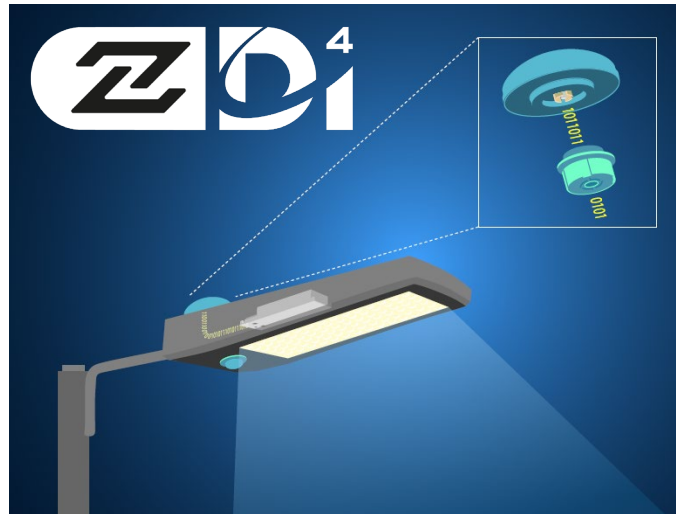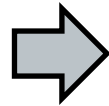
Book 18 for outdoor:
Book 20 for indoor:
- Mechanical interfaces
- Electrical pin assignment (Book 18)
- Electrical connectors (Book 20)
- References to D4i specs for power & control, and luminaire tests

Digital Illumination Interface Alliance

ZHAGA Consortium

D4i specifications for intra-luminaire DALI

Remote lighting-control network

DALI Part 351
(luminaire-mounted control devices)

Sensor and/or wireless communication node

DALI Part 150
(AUX power supply)

Optional AUX supply*

DALI Part 250
(integrated bus power)

DALI Parts 251-3
(data for enhanced asset tracking & performance monitoring)

DALI-2 LED driver with **integrated bus power supply** and **Smart Data**

➡ **Power**

↔ **Data**

Intra-luminaire DALI bus

LEDs

Luminaire

* AUX can be in the driver, or implemented in a separate product

Sensor node

DALI Part 351

Zhaga-D4i certification: Overview

- **Zhaga-D4i certification:** A joint program from Zhaga and DiiA
  - Certification for interoperable luminaires and sensors and/or communication nodes

- Based on **complementary specifications** from Zhaga and DiiA
  - Zhaga **Books 18 & 20,** plus **D4i** specifications from DiiA

- Product certification enables use of Zhaga and D4i logos
  - For **luminaires, sensors** and **communication nodes**
  - Logo indicates multi-vendor **product interoperability**

- Initial focus on **outdoor lighting** (Book 18), **indoor** solutions now added (Book 20)

- LED drivers are eligible for D4i certification from DiiA

Digital Illumination
Interface Alliance
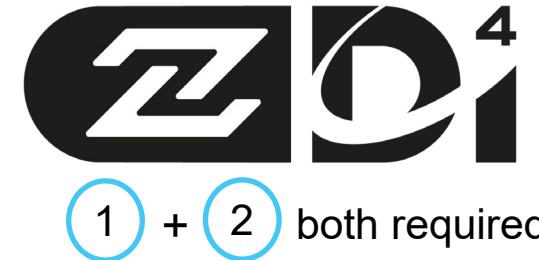
Z H A G A
Consortium

D4i and Zhaga–D4i certification

Outdoor luminaire with Zhaga receptacles

Communication node or sensor with Zhaga Book 18 plug

Zhaga Book 18 receptacle

Luminaire

AUX supply

Intra-luminaire DALI bus

D4i **driver**

LEDs

Second Book 18 node (e.g. sensor)

Digital Illumination Interface Alliance

ZHAGA Consortium
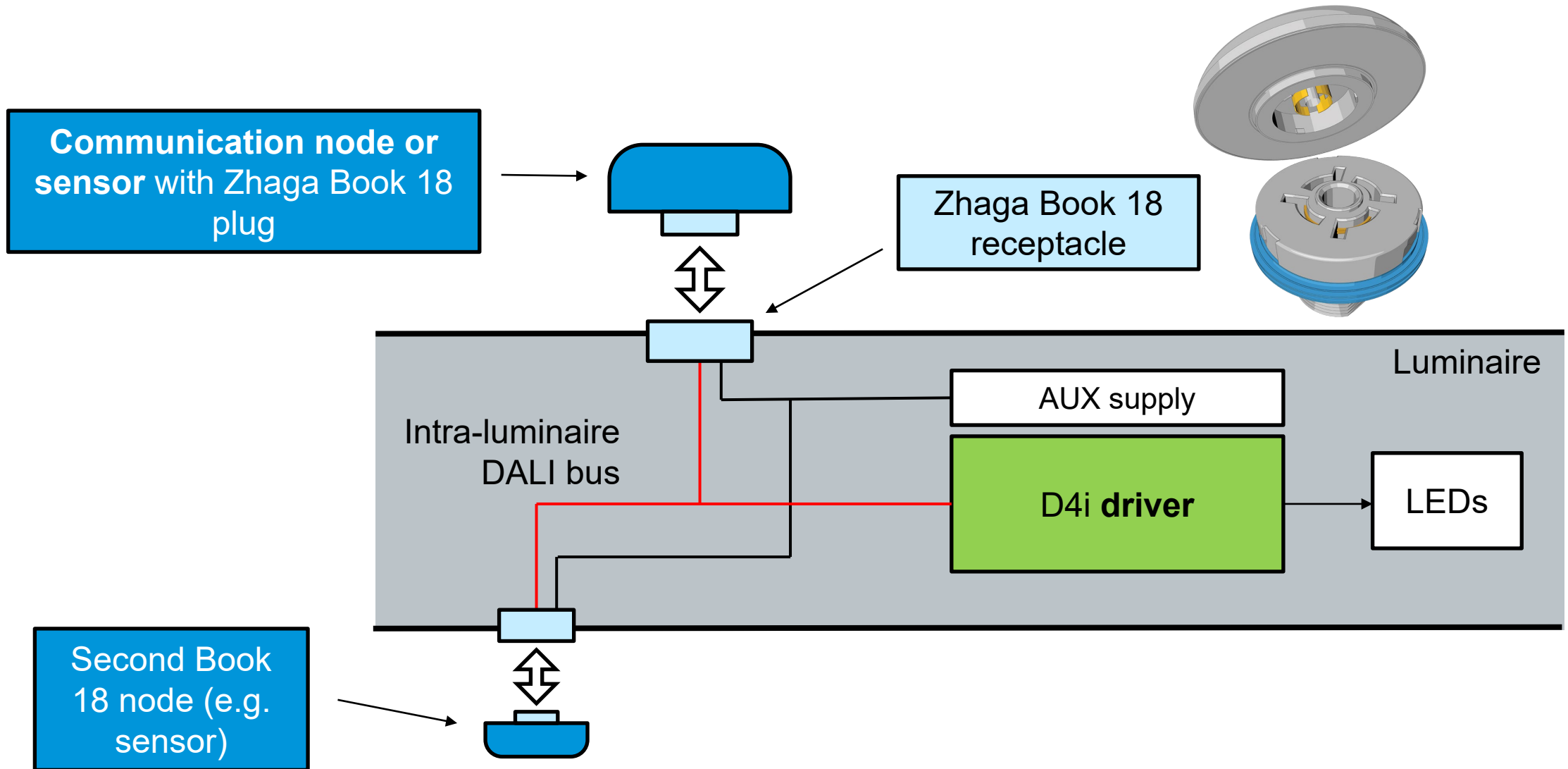
Zhaga-D4i certification for outdoor luminaires
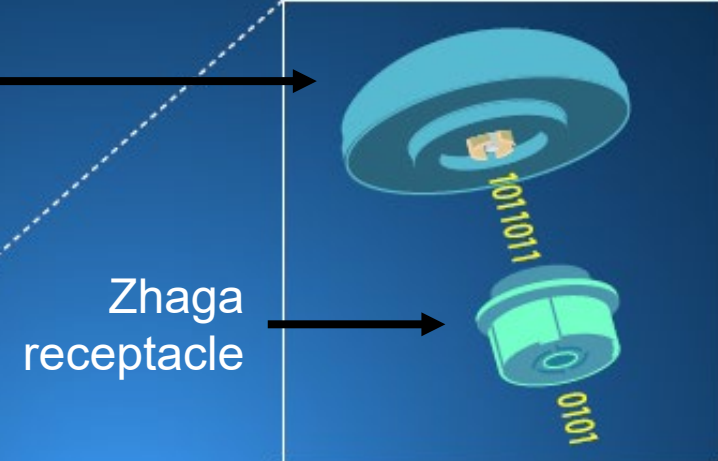
Zhaga-D4i node (sensor and/or wireless communication node)
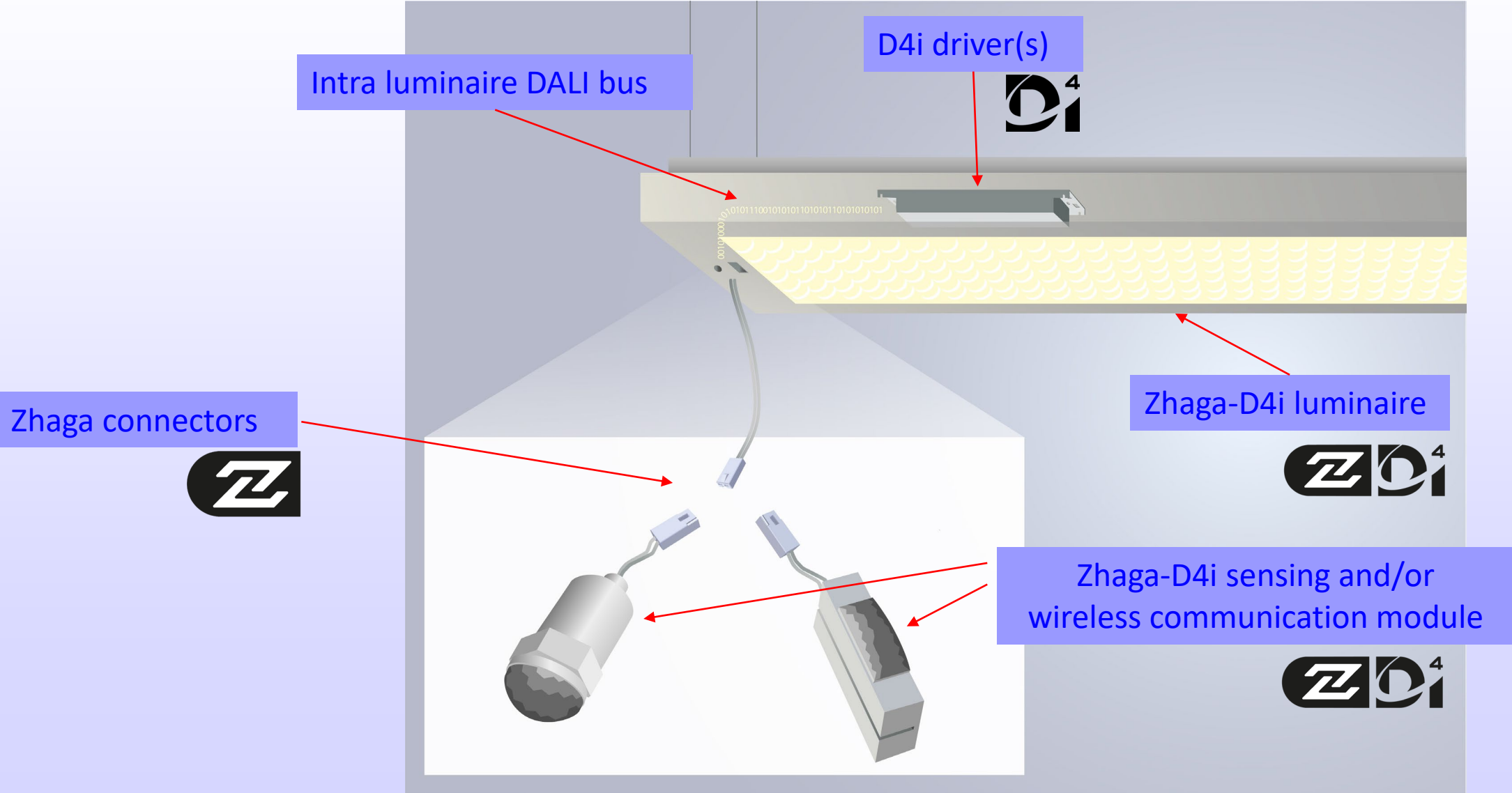
Zhaga receptacle

Intra-luminaire DALI bus

Zhaga-D4i luminaire (outdoor)

Second node

D4i driver

Digital Illumination Interface Alliance

ZHAGA Consortium

Zhaga-D4i certification for indoor luminaires

D4i driver(s)

Intra luminaire DALI bus

Zhaga-D4i luminaire

Zhaga connectors

Zhaga-D4i sensing and/or wireless communication module

Zhaga-D4i certification

- Zhaga-D4i certification (Book 18 or Book 20) is available for:
  - Luminaires
  - Control devices (nodes)
- Zhaga-D4i certified products are listed on the Zhaga website

- Zhaga-D4i certification is available to Zhaga members

- For control devices:
  - First step is D4i certification; only available to DiiA members
  - D4i-certified products are listed on the DiiA website

- The Zhaga logo and the D4i logo are separate logos with separate trademarks. Usage is controlled by Zhaga and DiiA, respectively.

Zhaga-D4i luminaires:
(top) Luma Gen2 from Signify
(bottom) Izylum from Schréder

Zhaga-D4i certification: Benefits

- Certification gives confidence for **interoperability**
  - Certification carried out by **independent** authority
  - Certified products are **traceable** in public databases
  - Certification logos are **trademarked** to prevent misuse

- Certification gives business advantages
  - Certified luminaires and components are available from **multiple suppliers**
  - Certification logos provide an **established** brand for product marketing

- Certification ensures that luminaires are:
  - **Future-proof**
  - Will be able to host **next-generation** Zhaga-D4i nodes

Digital Illumination Interface Alliance

ZHAGA Consortium

More information

- DiiA specifications – www.dali-alliance.org/specifications/download.html

- D4i overview and FAQs – www.dali-alliance.org/d4i

- D4i certification – www.dali-alliance.org/d4i/certification.html

- Zhaga-D4i – www.dali-alliance.org/zhaga-d4i

- DALI product database – www.dali-alliance.org/products

- Zhaga product database – www.zhagastandard.org/products.html

Contact the DALI Alliance – www.dali-alliance.org/contact

Digital Illumination
Interface Alliance

ZHAGA
Consortium

Certification Process: Book 18 Zhaga-D4i Node

Organisation   **Process**   **Comment**

Associate or regular membership of DiiA is required

Digital Illumination Interface Alliance
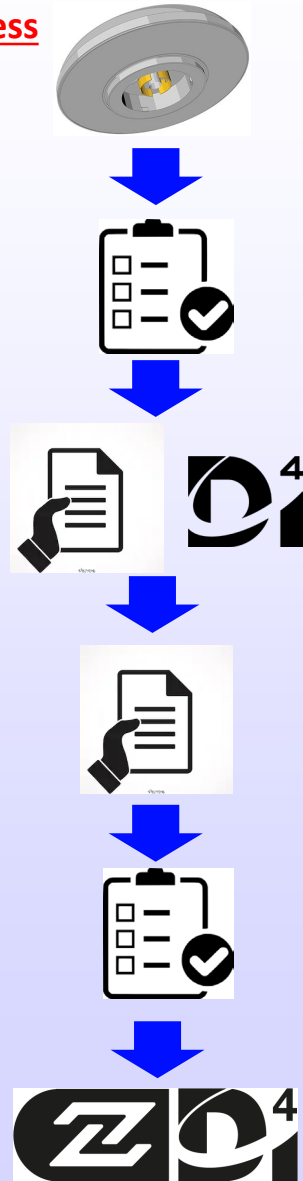
Product self tested or tested by DiiA test house

Submit results to DiiA for verification and D4i certification

Submit product documentation to Zhaga Test Centre

Tested for compliance against Zhaga specifications

Associate or regular membership of Zhaga is required

Product awarded Zhaga-D4i certification and use of Zhaga and D4i logos

16

Certification Process: Zhaga-D4i Luminaires

Organisation   **Process**   **Comment**

Compile required documentation and submit to Zhaga Test Centre

Tested for compliance against Zhaga specifications

Associate or regular membership of Zhaga is required

Product awarded Zhaga-D4i certification and use of Zhaga and D4i logos