ArenaVisionLED System Introduction

Contents

PHILIPS

Technical introduction

In high-end sports pitch lighting, like the Philips ArenaVision products, a large number of luminaires is used distributed around the stadium to create a uniform light intensity on the sports field, e.g. a football field. In most cases the luminaires are arranged around the stadium in a semi-rectangular or semi-circular arrangement. Sometimes they are arranged in multiple rectangular or circular arrangements of different dimensions. See examples below:
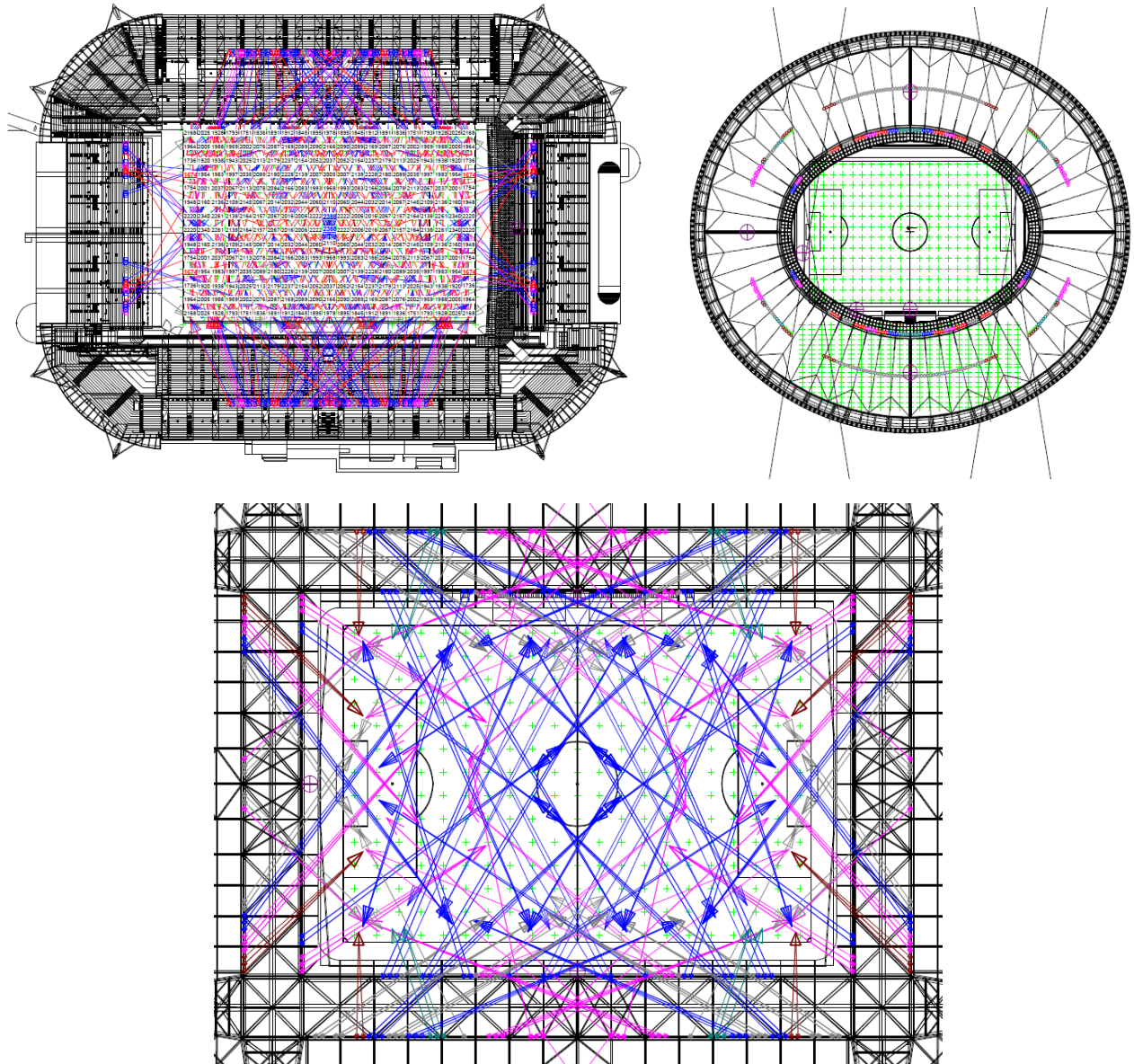
The ArenaVisionLED system is the latest Philips product to support the near future requirements for stadium lighting and is an extension of the successful Arenavision HID system.

The objective for ArenaVisionLED documentation, of which this is the introduction, is to primarily focus on the configuration and commissioning of the ArenaVisionLED system (see Figure 2).

How to use the ArenaVisionLED documentation

Italic texts in documentation indicate that the meaning shall be taken literally. In general, *italic* words are references to exact definitions in GUI items, documentation and or (software) components used .

The complete set of documentation is required to configure/commission an ArenaVisionLED system. In the situation that parts can/may be skipped this is indicated.

The complete set of documentation consists of:

Introduction	This is a brief explanation what an ArenaVisionLED system is about. It introduces the project realization approach as well as disciplines involved during realization and domain definitions, acronyms and abbreviations.
Electrical Installer Manual	Introduces the available components and guidelines to be applied for an ArenaVisionLED system. Final step for this discipline is the Electrical Site Acceptance Test (eSAT) that arranges handover from electrical installer to commissioning discipline.
DMX Address Configuration Manual	Describes the commissioning activities (DMX address assignments) of the ArenaVisionLED system. It includes a step by step explanation of the commissioning process using the *Luminet Monitor* tool.
Scene & Chase Configuration Manual	Configuration of Pharos devices, including example settings.
Site Acceptance Test (report)	A template document to be used to handover the system to customer. The template must be tuned for each customer, to meet the customer specific requirements.
Fault trees & Replacement workflows	Describing the maintenance instructions for fault finding and replacement of components.
System release notes	For each system release, a change document will be created to explain configuration changes.

Definitions, acronyms and abbreviations

In table below abbreviations strongly related to the ArenaVisionLED system are in *italics*. All other definitions are often used in the domain.

Abbreviation	Definition	Description
	@Philips intranet	ArenaVisionLED intranet location (Philips employees only) Select: *Products -> Outdoor -> ArenaVision LED*
	Artnet	Artistic License network protocol to distribute DMX/RDM over IP/UDP.
	ArtNet Universe & Sub-Net	A Universe containing the data to be transported in a single DMX cable resulting in 512 slots of data (every slot contains one byte of data). In ArtNet (version 2) there are 256 universes, which sums up to 512*256=131072 slots.
BPS	Button Panel Station	Pharos component to support physical push buttons.
	Button panel	A set of buttons enabling scene selection.
	Commissioning	Assigning addresses in the system; DMX-addresses in the drivers, IP addresses in Pharos component and Luminet nodes.
	Configuring	Specifying additional settings such as light parameters, creating scenes, creating touch-screens, etc.
	Control panel	A touch screen or a button panel.
	Controls network	The cooperation of all components with associated wiring for the ArenaVisionLED system.
	Control system	Is a combination of components and operation modes enabling the functionality of the ArenaVisionLED system.
DMX	Digital MultipleX	A communication protocol and physical interface to control luminaires. It is a one directional stream of data sent periodically (30-40 times a second).
	DMX address	Represents the first slot number in the DMX frame, the device listens to. For example when a device is set to DMX Address 15 and needs 3 bytes of data (Like 3 colors R,G and B) it will listen to slot 15 for Red, 16 for Green and 17 for Blue.
	DMX/RDM	Remote Device Management, extension to DMX to read information from luminaires.
	DMX Universe	The limit of 512 slots that can be sent over one DMX cable is called a Universe.
	Driver	Electronic DMX/RDM device to control a luminaire.
	Driver box	A box containing multiple drivers to support one ArenaVisionLED luminaire.
DS	Data Sheet	A data sheet is generally used for technical communication to describe technical characteristics of a product.
eSAT	Electrical Site Acceptance Test	Tests defined for handover from electrical installer to configurator/commissioning discipline.
	Ethernet	A family of computer networking technologies for local area networks (LANs). Ethernet is standardized as IEEE 802.3.
GUI	Graphical User Interface	Is a type of user interface, allowing people to interact with programs in more ways than just typing.
	Interweaving	The technology to optimize the data stream for both RDM and DMX commands.

Abbreviation	Definition	Description
LAN	Local Area Network	Is a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their smaller geographic area, and non-inclusion of leased telecommunication lines. Standalone LAN = A LAN that is not connected to a Wide Area Network (WAN) and/or any other network, and thus also not to the Internet.
LP	Light Plan	A configuration file created to define all device locations including their labeling (electrical installer), extended with commissioning information. A handover of the LP (for an example see appendix in *DMX Address Configuration Manual)* shall be part of the eSAT test procedure.
	Light point	*Generic term to refer to a luminaire, which in our situation consists of 4 independently controlled LED panels.*
	Luminaire	Combination of a driver and light engine. In the ArenaVisionLED system, a luminaire consist of 4 light generation modules and 4 drivers (each light generation module requires one driver).
	Luminex Artnet Node	The ArenaVisionLED system controller where configuration data is stored and maintained. In addition it takes care of converting Artnet messages to DMX using multiple universes when required.
LPC	Lighting Playback Controller	Lighting Playback Controller. Different types are available capable of controlling from 512 till xx DMX addresses.
TPC	Touch Panel Controller	Touch Panel Controller, capable to control up to 512 DMX addresses. For the ArenaVisionLED system we always deploy a LPC for control.
RDM	Remote Device Management	A protocol enhancement to USITT DMX512 that allows bi-directional communication between a lighting or system controller and attached RDM compliant devices over a standard DMX line.
SAT	Site Acceptance Test	Formal acceptance of site functionality by customer.
UID	Unique identifier	A 6 byte Unique IDentifier used within RDM. It is a long address to assign each device a unique ID. The UID is assigned iduring manufacturing and is built up of: ▸ 2 bytes for a manufacturing code ▸ 4 bytes sequence number per manufacturer.
	Universe	When using DMX cable, it is one single cable. When using Artnet/IP it is one IP message containing 512 DMX addresses.
	Scene	Scenes can be dynamic or static. ▸ Static: each luminaire receives a single dim level. ▸ Dynamic: a sequence of static scenes.
	Slot	A location within a Universe, sometimes also referenced as the DMX address, which is a value in the range 1-512.

Table 1 Definitions, acronyms and abbreviations

Involved disciplines

An ArenaVisionLED system project facilitates project realization for both new stadiums as well as refurbishment of existing ones. Depending on the situation the following high level tasks for project execution can be distinguished.

▶ Create construction drawings for the stadium.
Realization of ideas and concepts for a stadium, which is the basis of all further activities.
> For new stadiums, lighting designers can be involved in an early stage to specify lighting specific requirements to be included in the construction drawings.
> For existing stadiums, the lighting designers use the available construction drawings to decide on the position of the luminaires.

▶ Create the light plan of the stadium. They create a foot print for the location of the luminaires based on the required light levels for the stadium and construction drawings. A simplified version is shown in the figure below.
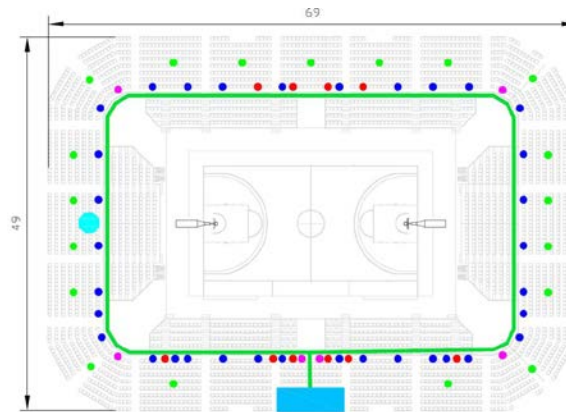

Figure 1 Location/position information of all luminaires available

The Light Plan specifies locations of luminaires including their aiming (spot on field), types of luminaires and light distribution. In the example the colors indicate different luminaire types.

> Luminair type ArenaVisionLED model   W   ●
> Luminair type ArenaVisionLED model   X   ●
> Luminair type ArenaVisionLED model   Y   ●
> Luminair type ArenaVisionLED model   Z   ●

▶ Installation activities:
> Mounting and connecting (cabling/wiring) required ArenaVisionLED system devices. Cable specifications are specified in *Electrical Installer Manual*. Cable wiring diagrams of components are available in separate installation datasheets of components.
> Realize aiming for luminaires to focus on pre-defined points (as calculated) in the stadium, which is part of the Light Plan (LP). This activity is out of scope for the ArenaVisionLED documentation.

▶ Configuration/commissioning:
This activity is the main objective of the *DMX Address Configuration Manual* and the *LPC-TPC Pre-Configuration manual*. The LP of the lighting designer is input for this task, because it contains all locations of luminaires and drivers including the component identifications. The light plan is the basis for the project's configuration/commissioning activities.
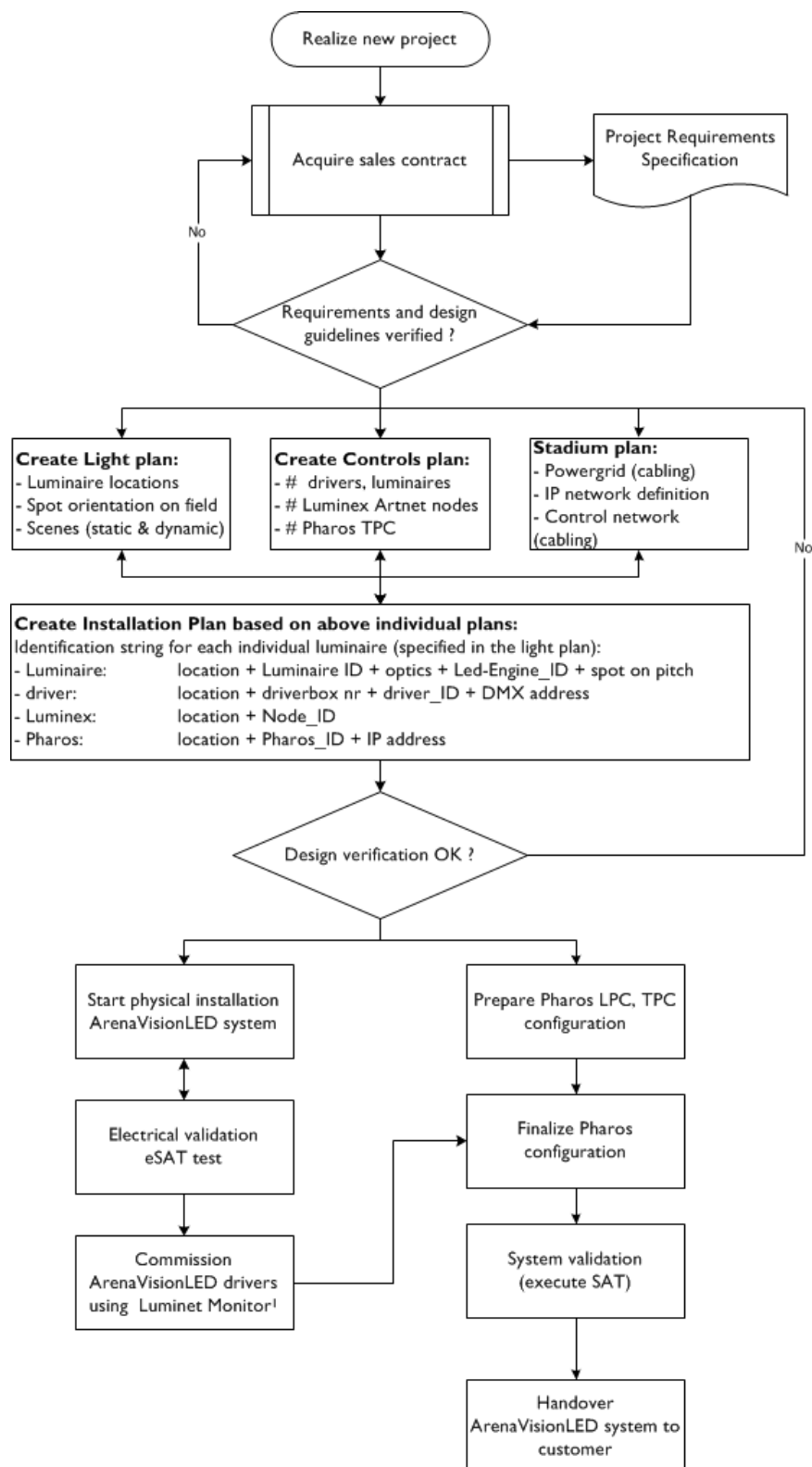
Project workflow example.

Figure 2 ArenaVisionLED system project workflow

Example of LP file

For readability purposes the Excel file is split in readable portions. The idea is to glue all parts in succession to create the complete overview of the Device Configuration Plan.

	defined in graphical installation plan	
	specified during installation	

Luminaire					
nr	Aiming coordinates (x,y)	Installation coordinates (x,y,z)	Lum_Type on Frame	Beam_Type on LED module	Connector block Input
1	(10,20)	(1,5,15)	HPC200	B4	1
1	(10,20)	(1,5,15)	HPC200	B4	2
1	(10,20)	(1,5,15)	HPC200	B4	3
1	(10,20)	(1,5,15)	HPC200	B4	4
2	(12,30)	(10,5,15)	HPC200	B2	1
2	(12,30)	(10,5,15)	HPC200	B2	2
2	(12,30)	(10,5,15)	HPC200	B2	3
2	(12,30)	(10,5,15)	HPC200	B2	4

Cable Luminaire -Driverbox				Cabinet	
Length (m)	Labels			nr	Installation
	Left		Right		coordinates (x,y,z)
148	HPC200_B4_1_1		1_1	1	(12,5,30)
150	HPC200_B4_1_2		1_2	1	(12,5,30)
152	HPC200_B4_1_3		1_3	1	(12,5,30)
154	HPC200_B4_1_4		1_4	1	(12,5,30)
180	HPC200_B4_2_1		2_1	1	(13,5,30)
181	HPC200_B4_2_2		2_2	1	(13,5,30)
182	HPC200_B4_2_3		2_3	1	(13,5,30)
183	HPC200_B4_2_4		2_4	1	(13,5,30)

Driver Box						Luminet PC	
Installation coordinates (x,y,z)	nr	Connector Output	SW	RDM address Unique ID	DMX address	IP address	
(12,5,30)	1	1	0,8	5068:0000202	1	10.45.67.2	
(12,5,30)	1	2	0,8	5068:0000002	2	10.45.67.2	
(12,5,30)	1	3	0,8	5068:0000064	3	10.45.67.2	
(12,5,30)	1	4	0,8	5068:0000200	4	10.45.67.2	
(12,5,30)	2	1	0,8	5068:0000005	5	10.45.67.2	
(12,5,30)	2	2	0,8	5068:0000006	6	10.45.67.2	
(12,5,30)	2	3	0,8	5068:0000007	7	10.45.67.2	
(12,5,30)	2	4	0,8	5068:0000008	8	10.45.67.2	

Luminex Artnet Node						
Installation			Artnet		Luminex	nr
coordinates (x,y,z)	nr	output	Universe	SW version	IP Commis.	
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1
(10,10,10)	1	1	0	4.1.1.	10.45.67.20	1

Pharos LPC						Pharos TPC		
nr	Installation			Arnet		nr		Installation
	coordinates (x,y,z)	Universe	IP address	Universe	Adress		IP address	coordinates (x,y,z)
1	(0,0,10)	1	10.45.67.1	0	1	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	2	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	3	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	4	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	5	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	6	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	7	1	10.45.67.10	(0,0,10)
1	(0,0,10)	1	10.45.67.1	0	8	1	10.45.67.10	(0,0,10)

Cable requirements

See *Electrical Installer Manual*

Overview of software tools

See *DMX Address Configuration Manual*

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