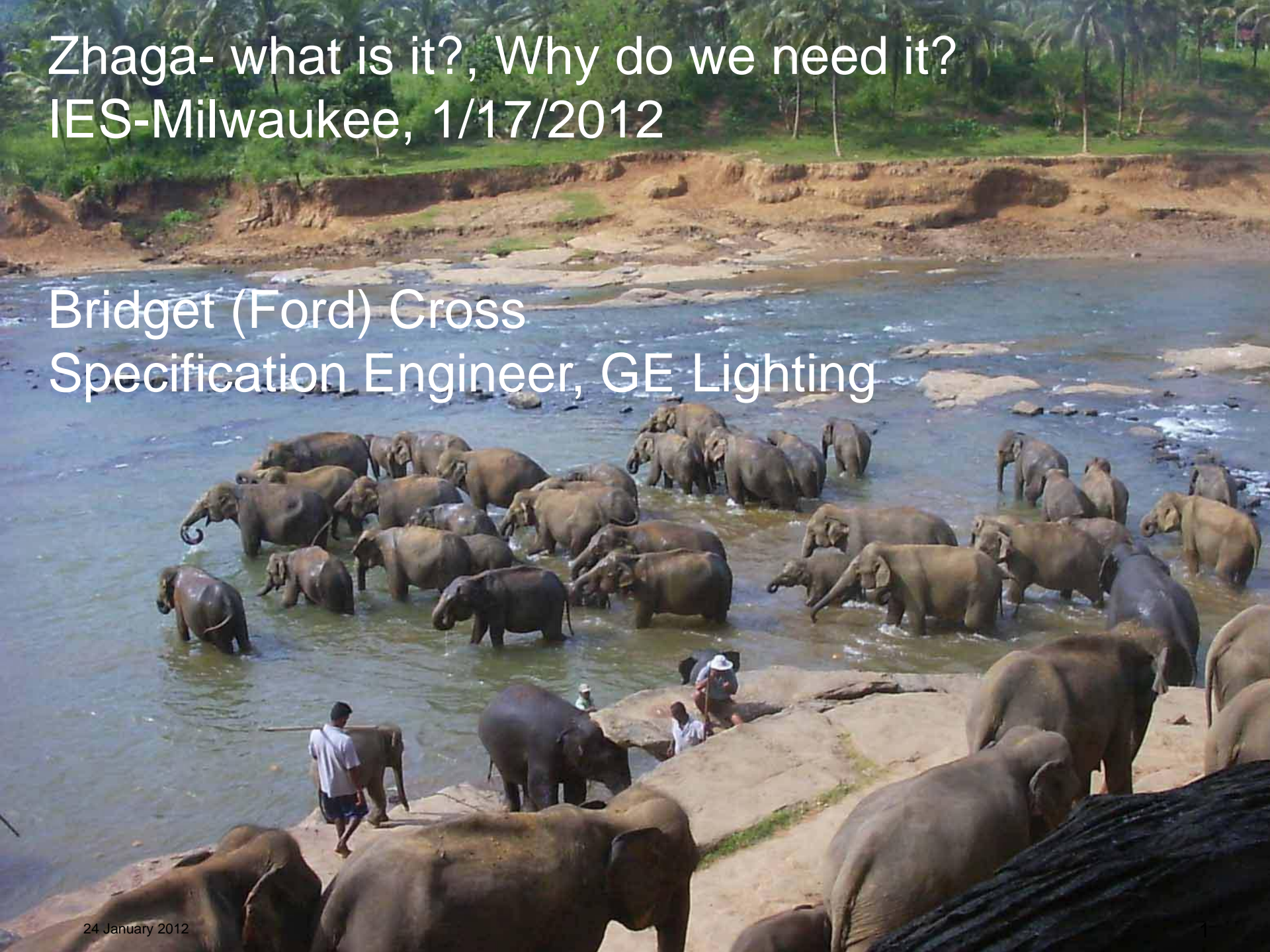


Zhaga- what is it?, Why do we need it?
IES-Milwaukee, 1/17/2012

Bridget (Ford) Cross
Specification Engineer, GE Lighting





Consortium for the
standardization of
LED light engines



Presented September 2011

Andy Davies
Co-Chair
Zhaga General Assembly

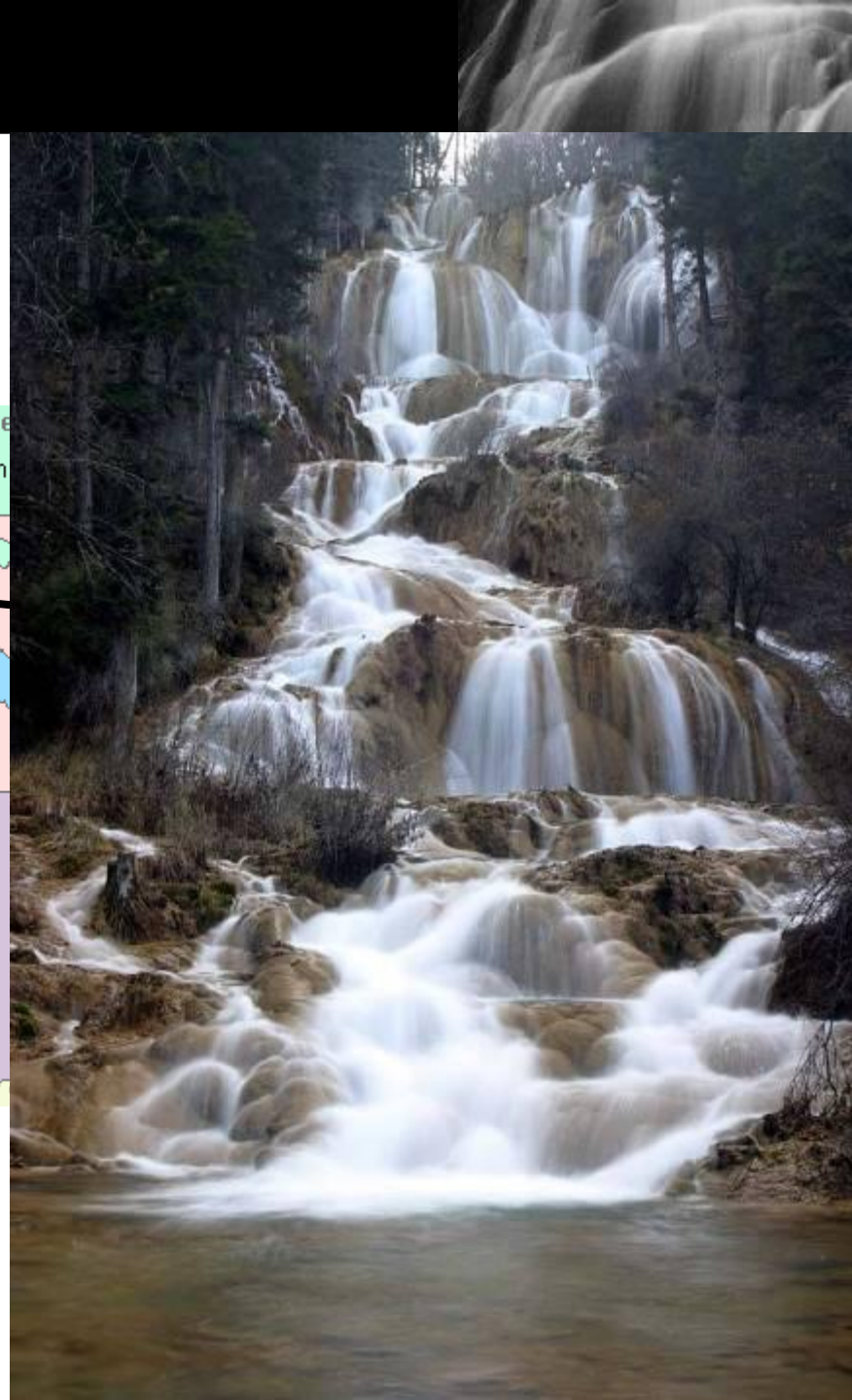
Sales Development Director, LED
Modules
GE Lighting EMEA

What does Zhaga mean?

There is no special meaning.



Zhaga is a waterfall in China



Zhaga is a cooperation between companies

- 167 members
 - 55 members with voting rights
 - From Asia, North America, Europe
 - Companies you recognize such as:
 - Acuity, Cooper, Zumtobel, Iguzini, Ideal, Leviton, BJB, Lutron, GE, Osram, Philips, Panasonic, Ideal, Nuventix, Cree
- Meeting every 6-8 weeks
 - 3 day meeting
 - 80-90 participants





Why Interchangeable light engines?

- The lighting industry has historically worked with standardized light sources, especially in the US and Europe.
 - Greater flexibility of fixture types on a project with a common base.
 - Allows multiple sources
 - Existing Supply Chain
- LED light source platforms are rarely unique.
- Utilizing Existing base types for LED is counter productive.
- Zhaga will make LED light sources also interchangeable



Reflector/ optic
Focal Point
Heat
Power Supply



Edison Base: 1909 “medium base”

- Early U.S. lamp manufacturers used different and incompatible bases. Examples:
 - Thomson-Houston Electric Company used a threaded stud at the bottom of the socket, and a flat contact ring.
 - Sawyer-Mann, or Westinghouse base used a spring clip acting on grooves in the bulb base, and a contact stud at the bottom of the lamp.
 - In response to Edison's patent, Reginald Fessenden invented the bi-pin connector for the 1893 World's Fair. Other early lamp bases include the bayonet mount and wedge base.



Gelatinized Fiber
Invented By William Courtenay of New York



BERGMANN-ACORN



MOVING TONGUE



PUSH-PULL



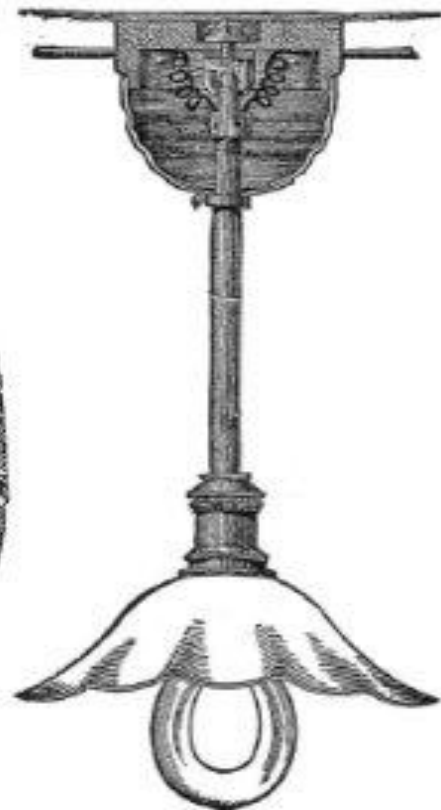


RAISING AND LOWERING DEVICE
For Use With Flexible Cords

Adjusting Balls
For Adjusting
Flexible Cord Pendants



Wooden Handle Or Finishing Piece
For Use With Flexible Cord Pendants

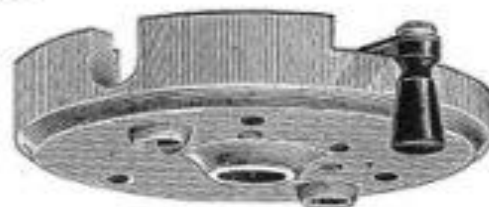


ORFORD'S
ROSETTE PENDANT

WEATHER-PROOF ATTACHMENTS
For Street Lights



Style Since 1888



New 1890 Style



ROSETTE AND SWITCH
For Series Lamps
Porcelain



- The Edison screw fitting , or Medium -Base developed by Thomas Edison and licensed starting in 1909 under the Mazda trademark.
- Most have a right-hand threading, so that it goes in when turned clockwise and comes out when turned counterclockwise. like a hardware screw.





Defining an LED light engine

- An LED light engine is the combination of an LED module and its associated electronic control gear ('driver').



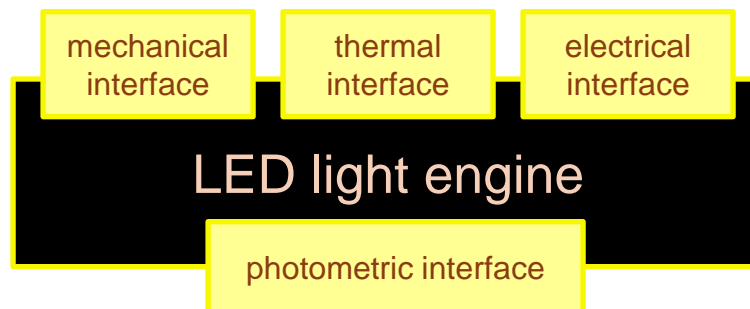
Light Engine with
Integrated Control Gear



Light Engine with
Separate Control Gear

Stable interfaces – Rapid innovation

- Zhaga specifies *only* what is necessary to enable the *interchangeability* of light engines from different manufacturers.
- The design freedom inside the light engines and in the luminaires is maximized.



Zhaga treats the inside of a light engine as a 'black box'

What is an interface?

Optical Interface

Defined zone for placement of optics (eg reflectors)

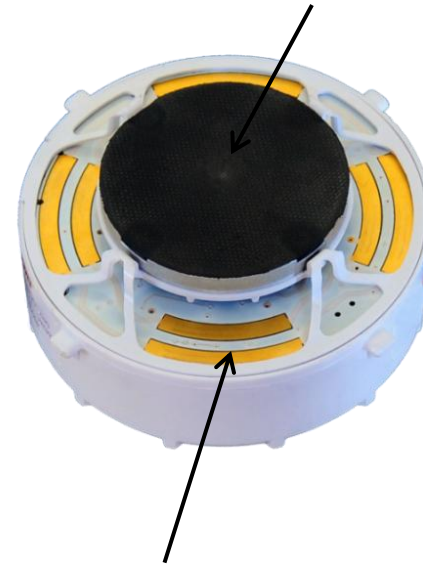


Mechanical Interface

Feature for physical attachment to luminaire

Thermal Interface

Surface for reliable thermal transfer to heatsink or other cooling system



Electrical Interface

Connection point for electric current

Zhaga will focus on interoperability through interface standardization, not on performance specification

Int'l Standardization organizations
Industry Consortia: Zhaga

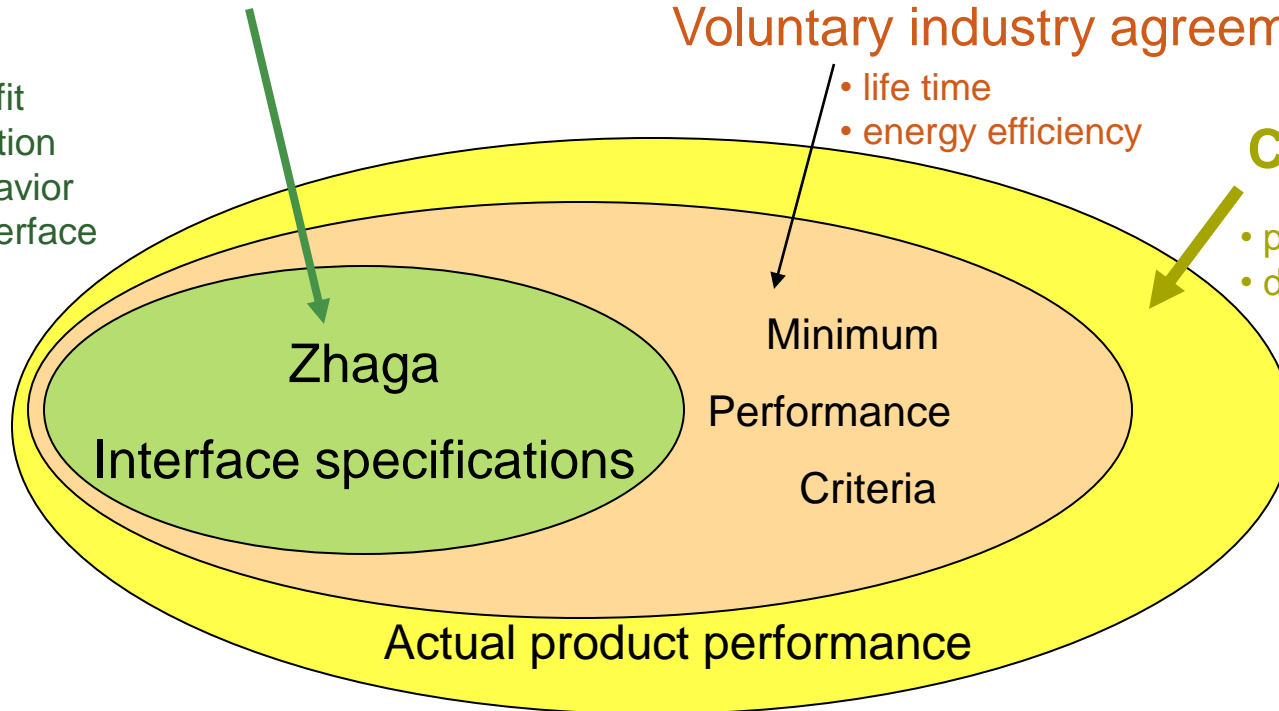
- mechanical fit
- light distribution
- thermal behavior
- electrical interface

Governments
Quality label organizations
Voluntary industry agreements

- life time
- energy efficiency

Companies

- product specifications
- data sheet

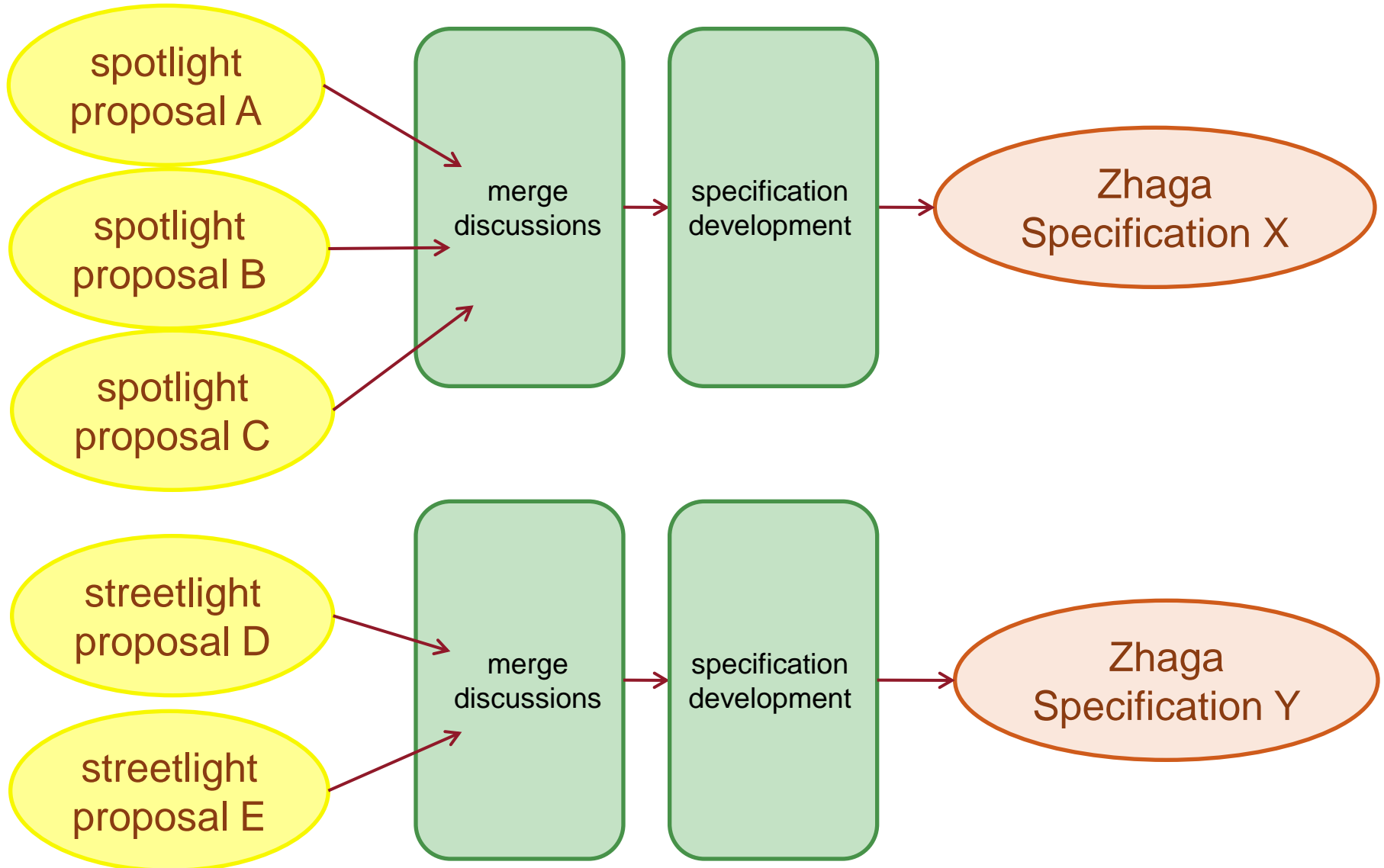




Way of working



Illustration of Zhaga's standardization process



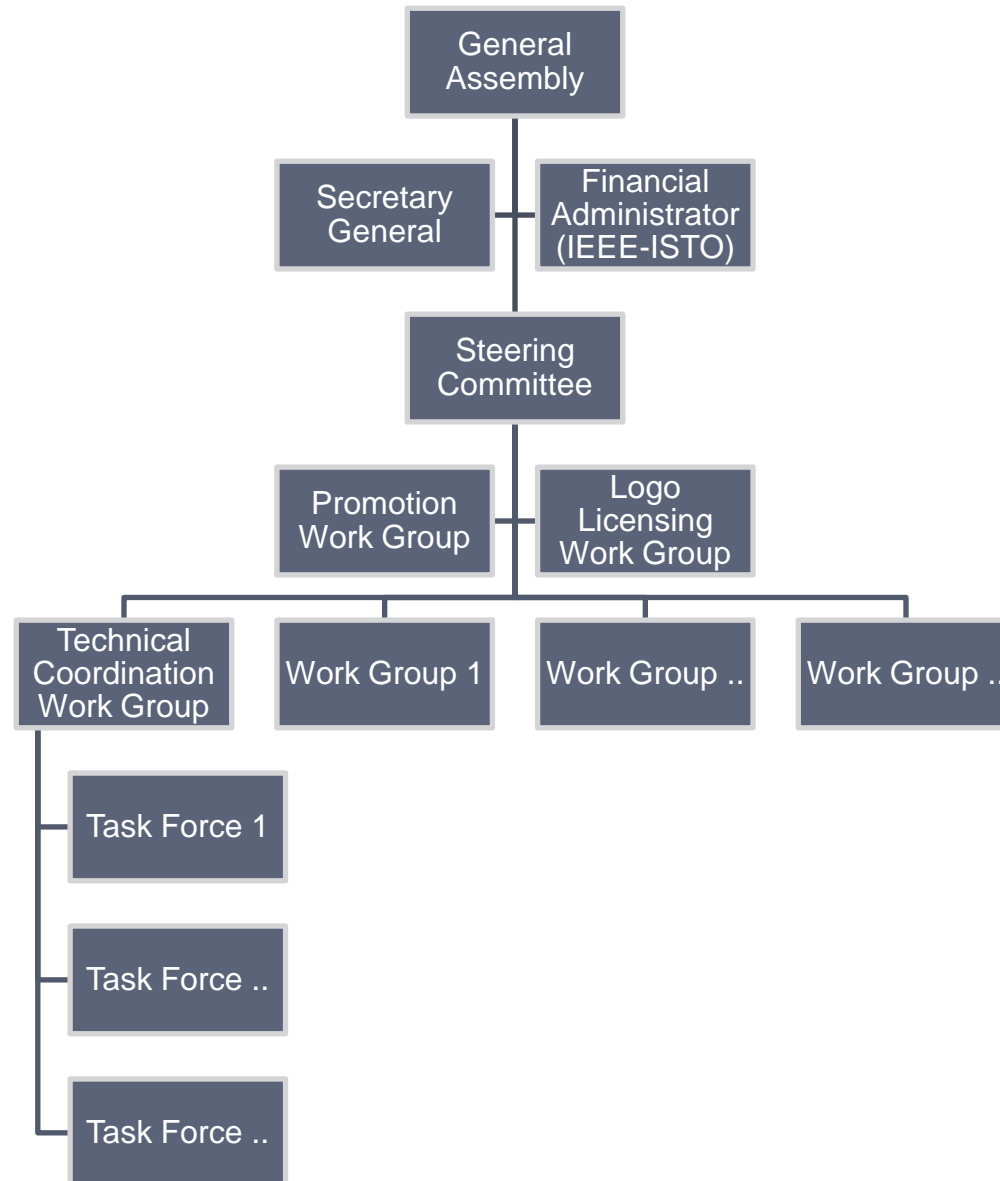


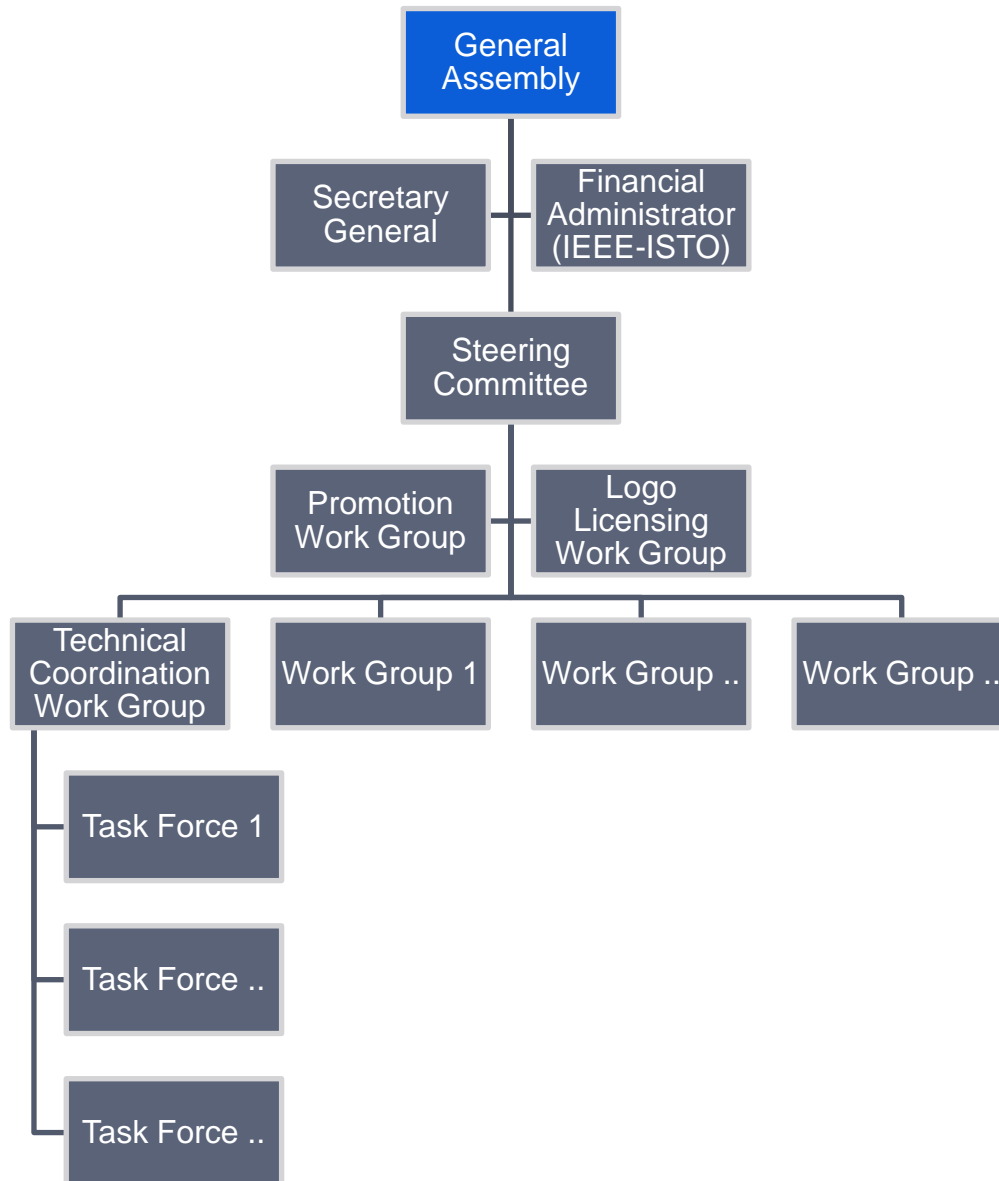
Merger phase is critical!

- Zhaga should not create two interface specifications with different mechanical fit for the same application
 - We must avoid arbitrary variations
- Differences between proposals must be analyzed and consequences understood before making choices.
- Choices must be based on technical merit



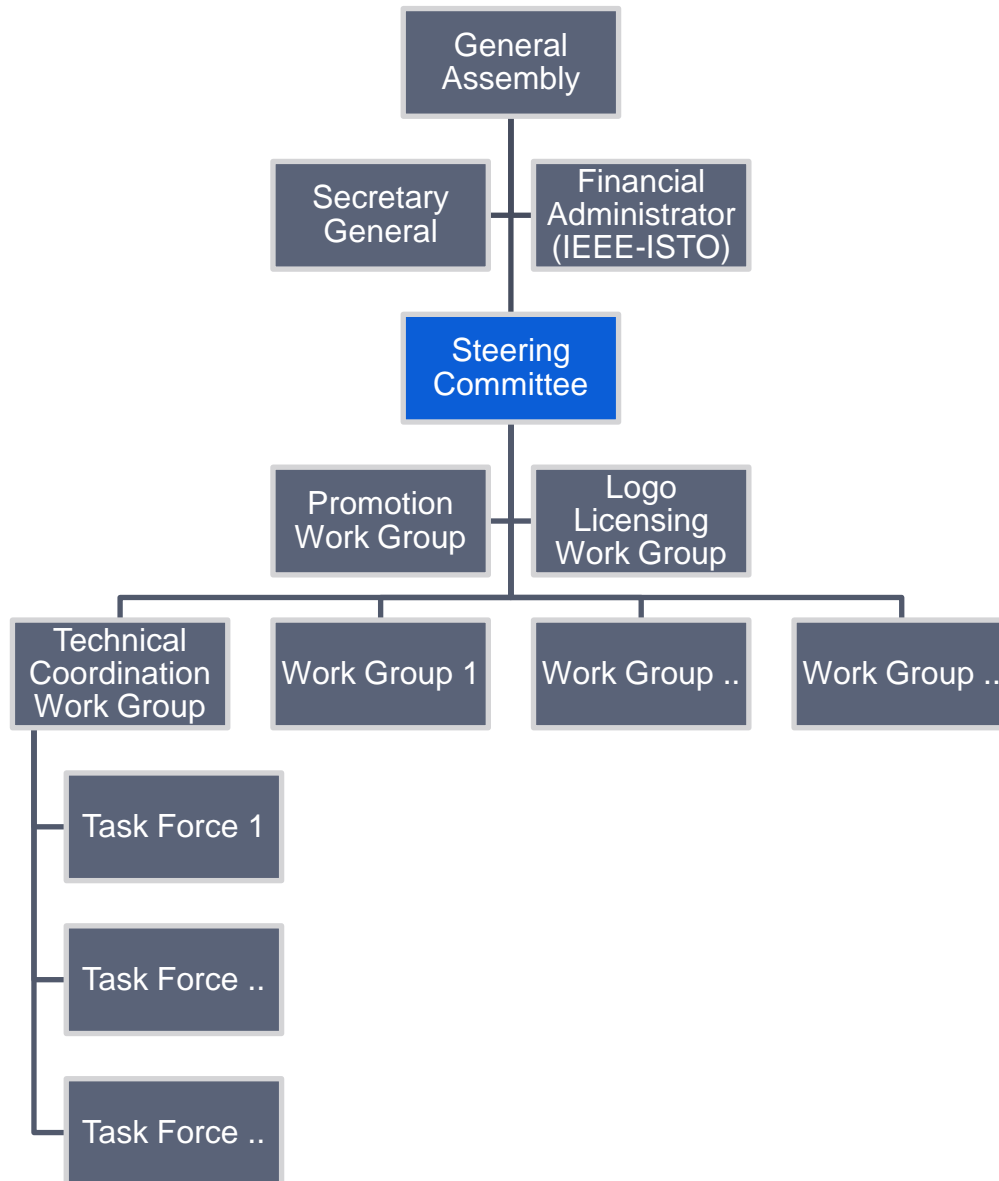
Organization





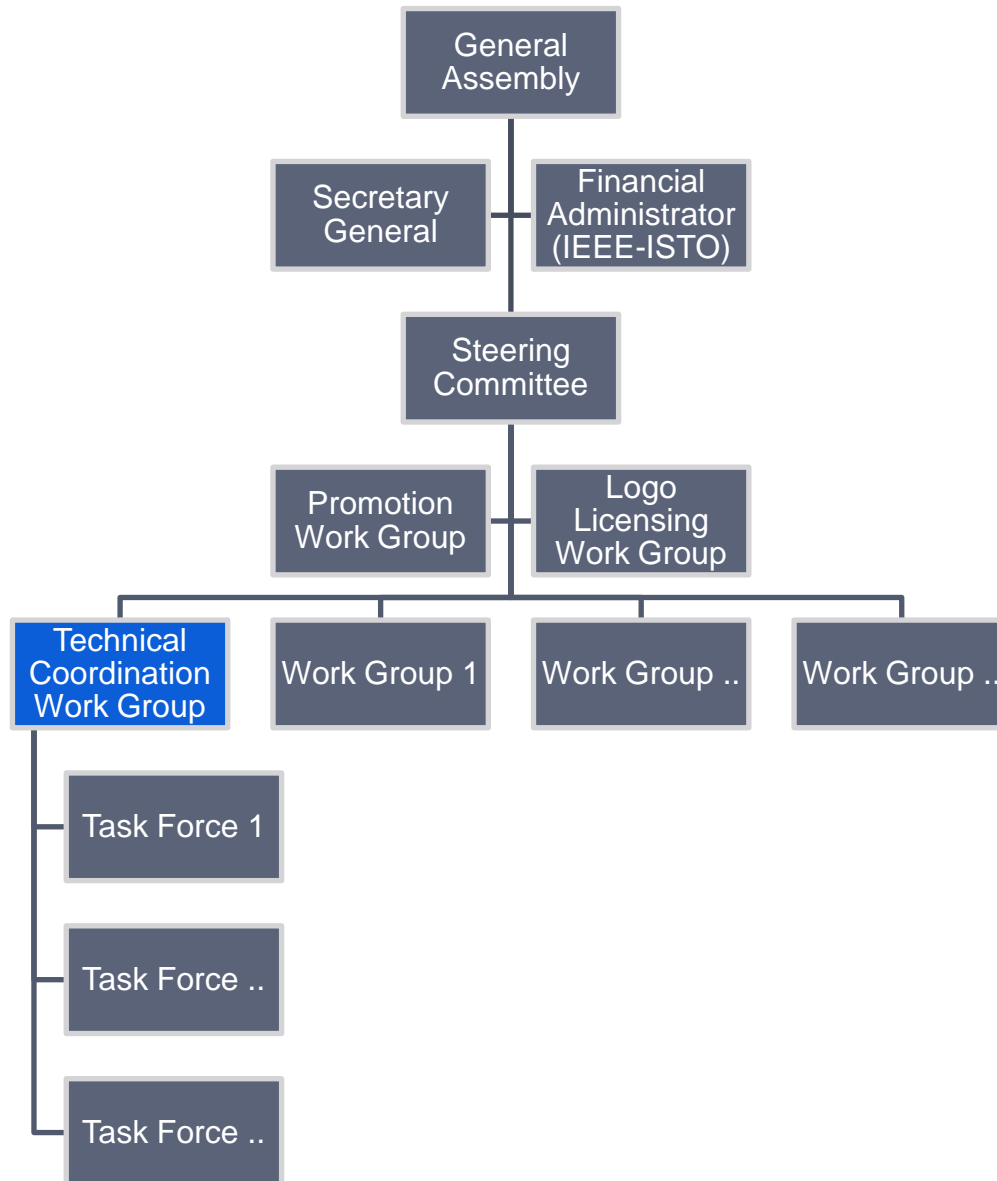
General Assembly

- Meeting of all associate members and regular members.
- Only regular members have voting rights



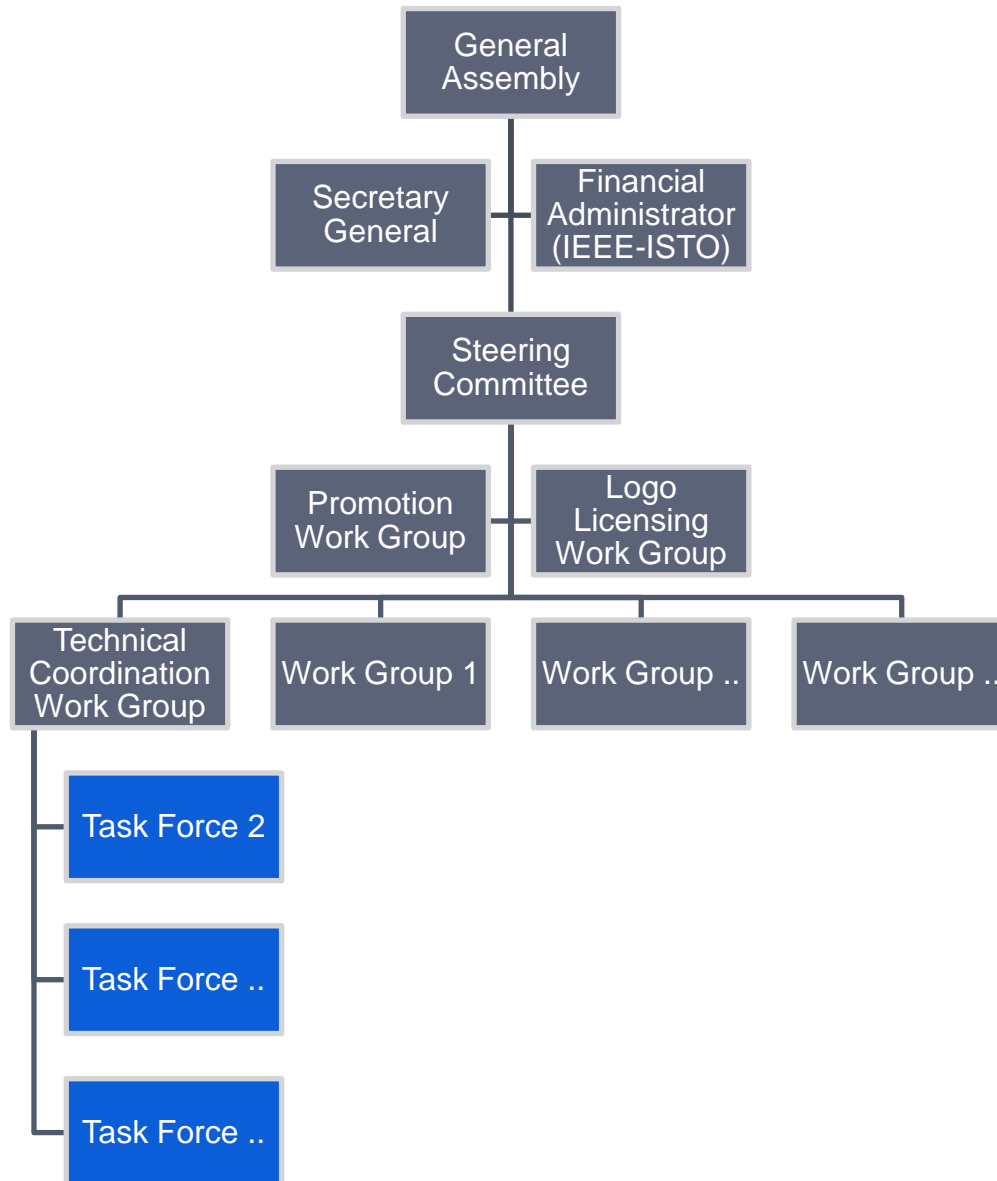
Steering Committee

- Elected by the General Assembly
- Authorizes the start, and stop, of work on new light engine specifications
- Defines the assignment (charter) of work groups
- Appoints chair, and vice-chair persons of work groups



Technical Coordination Work Group

- Responsible for consistency between deliverables of all technical work groups
- Responsible for the merger of proposals for light engine specifications



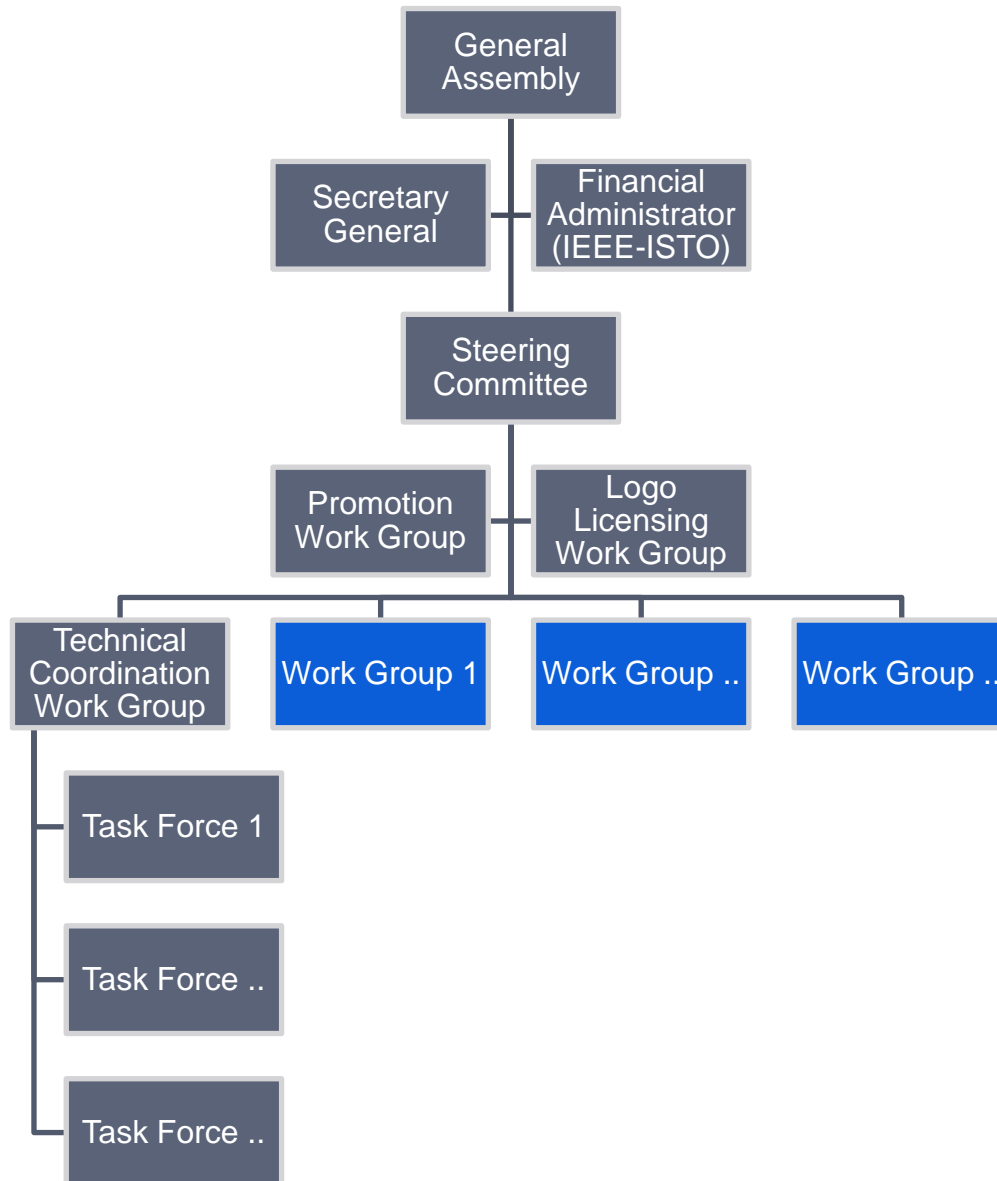
Task Forces

Created by the TCWG for two purposes:

1. Merge overlapping light engine proposals, or
2. Solve questions that need discussion by experts

• The TCWG has 5 active task forces:

- **TF 2**: Photometric interface expert group
- **TF 3**: Thermal interface expert group
- **TF 9**: Merger of indoor lighting LLE proposals
- **TF 10**: Study the possibility to specify dimming interfaces
- **TF 11**: Test lab procedures



Work Groups

- Established by the Steering Committee
- Develop and maintain the interface specification for a single light engine type.

Zhaga has 7 active work groups:

- **WG 1:** socketable downlight with integrated control gear
- **WG 2:** Spot light engine with separate control gear
- **WG 3:** Flat emitter street lighting engine with separate control gear
- **WG 4:** Socketable spot light LLE with separate control gear
- **WG 5:** Compact socketable LLE with integrated control gear
- **WG 6:** Mechanical interface of electronic control gear
- **WG 7:** LLE for indoor lighting applications

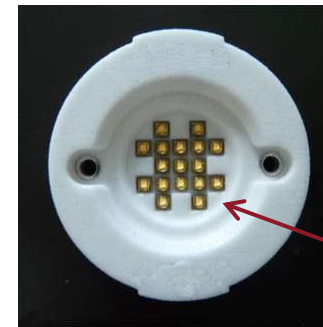


Progress

status September 2011

3 Light Engine Specifications approved to date

1. A socketable LED downlight engine with integrated control gear
✓ Approved February 2011
2. An LED spotlight engine with separate control gear
✓ Approved June 2011
3. A socketable LED light engine with separate control gear
✓ Approved September 2011



Note similarity between optical interfaces



Interfaces are shared across specifications where there is a common interest

Modules shown are examples of prototypes submitted to the Zhaga standardisation process



4 Light Engine Specifications in development phase

- A streetlight engine (non-socketable with separate control gear)
- A compact socketable light engine with integrated control gear
- A circular, 85mm, downlight engine for high lumen output (socketable with integrated control gear)
- A light engine with rectangular LED module for indoor use, with separate control gear. One indoor luminaire may contain several of these rectangular modules and one control gear



1 Light Engine Specification in merger phase

- A light engine with linear module (non-socketable with separate control gear) for indoor application.

1 Supporting Specification in development phase

- The mechanical dimensions and fixation points of LED control gear.



Logo

The Zhaga logo

- The Zhaga Logo can be used on products that implement a Zhaga specification



- Compliance with the Zhaga specification must be verified by an independent test lab.



Where are products with the Zhaga logo?

- Process of Certification (by independent test labs) is still in definition phase
- Once certification is finalized, we expect numerous Zhaga members products to be submitted and ultimately approved to carry the Zhaga logo



Summary

- Zhaga guarantees stable design platforms for luminaries
- Zhaga prevent market fragmentation into a large number of incompatible light engines
- Zhaga enables second source supply of LED light engines
- Zhaga brings LED lighting in line with common industry practice in the lighting industry



www.zhagastandard.org

• Source Update

Standardization in Zhaga related products both integral and independent Drivers.

LED Drivers! All shapes and sizes,



“Reduced” phosphor lamps



Zhaga – LED Light Engine Standardization

F28 T8 Family	Watts	Initial Lumens	Mean Lumens	Life IS (3 hrs)	Life IS (12 hrs)	Life PRS (3 hrs)	Life PRS (12 hrs)	CCT	CRI
F28T8 XL SPP	28	2,600	2,440	20,000	28,000	40,000	45,000	3500 K 4100 K 5000 K	80 80 80
F32 T8 25W Family	Watts	Initial Lumens	Mean Lumens	Life IS (3 hrs)	Life IS (12 hrs)	Life PRS (3 hrs)	Life PRS (12 hrs)	CCT	CRI
F32T8/25W SPP	25	2,500	2,350	30,000	36,000	40,000	45,000	3500 K 4100 K 5000 K	80 80 80
F32T8/25W	25	2,500	2,350	36,000	40,000	50,000	55,000	3500 K 4100 K 5000 K	85 82 80

This information is based on data publicly available at the time of printing.
GE and competitors product offerings may change at any time.

Ceramic Metal Halide

Next Generation
Increased interest in
Low wattage lamps,
200-350 watt category

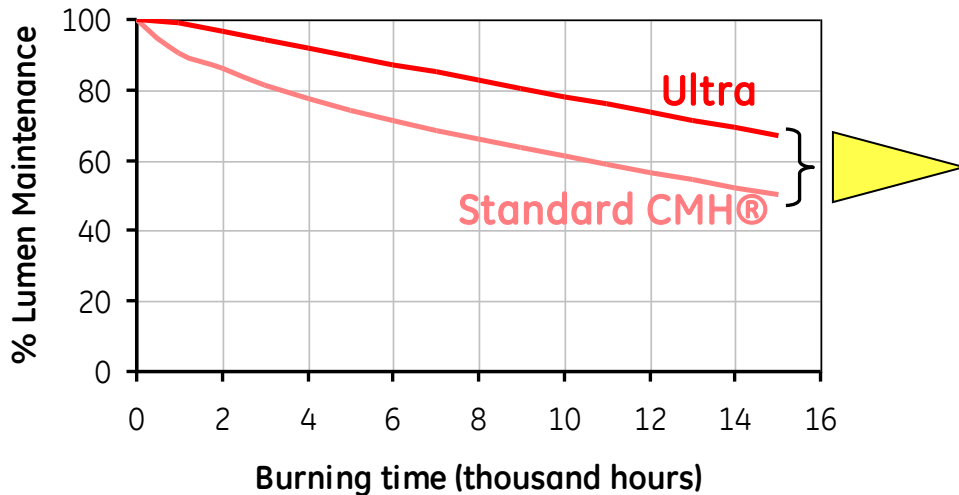
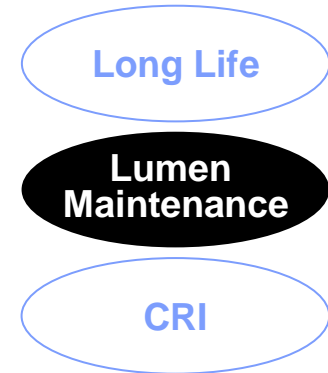




Ultra offers significant improvements in lumen maintenance!

	<u>Ultra</u>	<u>Standard CMH®</u>
G12	88%	68%
G8.5	87%	68%
G6.5	87%	68%
MR16	82%	64%

- More usable light over life extends group re-lamp cycles
- Less new fixtures needed to achieve specified light levels
- Group re-lamps: Reduce frequency of re-lamping to maintain specified light levels



Up to 26% more usable light at the end of rated life!

Ceramic Metal Halide

15,310



GU6.5	G8.5 Mini	G12	MR16	Double End RX7S	Elliptical Medium	PAR20	PAR30L	PAR38	Elliptical Mogul	Chromafit
20W 3K	20W 3K	20W 3K	20W 3K			20W 3K	20W 3K			
39W 3K	39W 3K	39W 3K	39W 3K			39W 3K	39W 3K	23W 3K Integral		250W 3K
39W 4K	39W 4K	39W 4K	39W 4K			39W 4K	39W 4K		250W 4K	
39W 3K Ultra	39W 3K Ultra	39W 3K Ultra	39W 3K Ultra	70W 3K	70W 3K		70W 3K	70W 3K	320W 4K	
	70W 3K	70W 3K							350W 4K	400W 3K
	70W 3K Ultra	70W 3K Ultra								
	70W 4K	70W 4K		70W 4K	70W 4K				400W 4K	
				150W 3K	100W 3K			100W 3K		
				150W 4K	150W 3K					
					150W 4K					

GE Exclusive

GE and Philips, no OSI

Thanks!

Bridget Cross

Bridget.Cross@ge.com

708-738-4947

