

400 North Fourth Street
Bismarck, ND 58501
701-222-7900

November 2, 2020

Executive Secretary
North Dakota Public Service Commission
State Capitol Building
Bismarck, ND 58505-0480

Re: Case Nos. PU-15-592, PU-17-192
and PU-20-417
Light Mitigation Time Extension

Montana-Dakota Utilities Co. (Montana-Dakota) herewith electronically submits information requested at the Informal Hearing held October 21, 2020. The Company requested information regarding Light Intensity Dimming Solution (LIDS) technology from the vendor. The information is included as Attachment A. A second fact sheet summarizing LIDS technology is included as Attachment B.

In addition, the Company is providing a link for a video containing additional information. Please see <https://lidsinfo.com/en/video>. The video demonstrates the lighting intensity differences.

Montana-Dakota also provides the recent operating results for hours of operations under each lighting intensity for the Mont Saint Marguerite Wind Farm, a Canadian operation, that utilizes LIDS technology as summarized in the table below.

100% Intensity	38%
30% Intensity	3%
10% Intensity	<u>59%</u>
	100%

The Company requested information regarding software maintenance. The Aircraft Detection Lighting Systems (ADLS) annual maintenance fee includes a component for software maintenance. LIDS technology does not require software maintenance.

- 2 PU-20-417 Filed 11/02/2020 Pages: 25
Response to information requested at 21 Oct. 2020 Informal Hearing
Montana-Dakota Utilities Co.
Travis Jacobson, Director of Reg. Affair
- 60 PU-17-192 Filed 11/02/2020 Pages: 25
Response to information requested at 21 Oct. 2020 Informal Hearing
Montana-Dakota Utilities Co.
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- 45 PU-15-592 Filed 11/02/2020 Pages: 25
Response to information requested at 21 Oct. 2020 Informal Hearing
Montana-Dakota Utilities Co.
Travis Jacobson, Director of Reg. Affair

If you have any questions regarding this filing, please contact me at (701) 222-7855 or travis.jacobson@mdu.com.

Sincerely,

/s/ Travis R. Jacobson

Travis R. Jacobson
Director of Regulatory Affairs

Attachments

Attachment A



Never Alone in the dark.

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LIGHTING WIND FARMS – WHAT’S IMPORTANT

- ❑ Basis
- ❑ Temporary Lights
- ❑ Permanent Lights (**LIPS** compatible)
- ❑ Side Lights
- ❑ Compare US and Canadian Rules
- ❑ Lighting Mitigating Solution (**LIPS**)
- ❑ Compare **LIPS**
- ❑ North Dakota Legislation



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WHY DO WE NEED LIGHTS?

FAA & TC justification for 2,000 cd Worse Case Scenario



Design Speed
165 knots (190 mph)

L-864 (Red Beacon)
2,000cd



Aircraft Turning Lag
1.3 km (4,265 ft)

Required Avoidance Distance
0.6 km (2,000 ft)

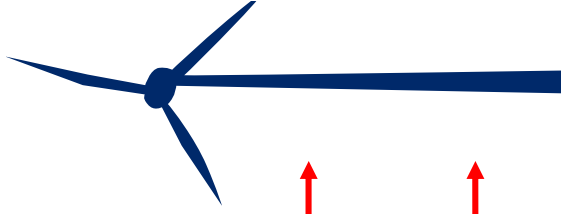
Acquisition Distance
1.9 km (6,234 ft)

CL-810 (Red Marker)
32cd

Acquisition Distance
1 km (3,280 ft)



Aircraft Turning LAG
1.3 km (4,265 ft)



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TEMPORARY LIGHTS

Not Allowed

NOTAM



Banned

Concession



CL-810 (32 cd)

Allowed, required on all turbines (two required if one light is blocked)

Original



CL-864 (2,000 cd)

Required on permanent, lit turbines



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PERMANENT LIGHTS CL-864 FEATURES

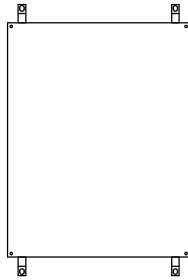
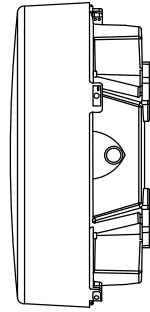
- ❑ GPS Synchronization
- ❑ Soft-on, Soft-off
- ❑ Power supply separate from light
- ❑ Built-in Photocell
- ❑ Simple Installation
- ❑ Ethernet Compatible
- ❑ NVG* Compatible
- ❑ **LIPS** Compatible
- ❑ 5 year warranty

* Night Vision Goggles (Infrared)

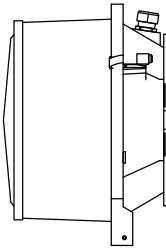


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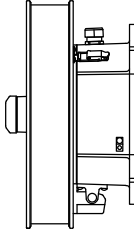
ORGA - L550



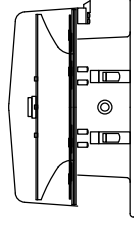
ITL – IFH-1710



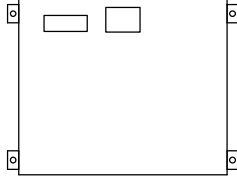
FTCA – FTS-370i



Dialight – D464



Techno - RED



6C Cable
26.5 lbs.
17 Watts (30 fpm) Avg.
20.1" x 9.5"
120-230 VAC
DC Supply in Flash Head
No Separation

6C or 8C Cable
28 lbs.
23 Watts (30 fpm) Avg.
16.5" x 11"
120-230 VAC
DC Supply in Flash Head
No Separation

5C or 10C Cable
26.3 lbs.
14 Watts (30 fpm) Avg.
15.75" x 8.69"
120-230 VAC
DC Supply in Flash Head
No Separation

5C or 8C
18 lbs.
12 Watts (30 fpm) Avg.
15.05" x 8.49"
120-230 VAC
DC Supply in Flash Head
No Separation

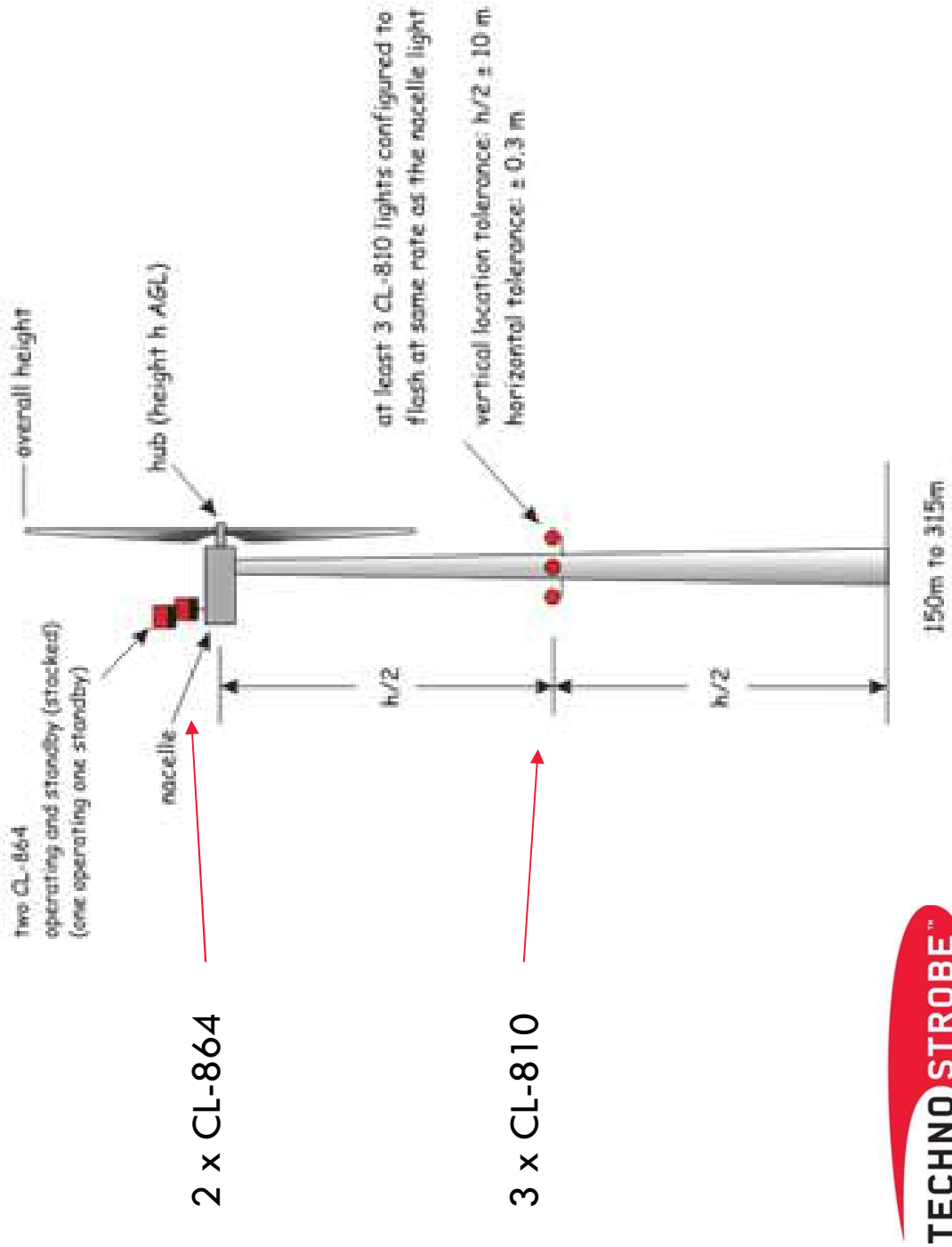
4C Cable
7 lbs.
10 Watts (30 fpm) Avg.
6.7" x 5"
120-230 VAC
DC Supply in Power Supply
177m+ Separation



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NEW TC RULES – SIDE LIGHTS FOR TOWERS ABOVE 150M

MARCH 1ST 2016 AND ADVISORY CIRCULAR (AC) NO. 302-025 OCT. 2016



2 x CL-864

3 x CL-810



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COMPARE US AND CANADIAN STANDARDS

Item	FAA	Transport Canada
Minimum height* requiring light	> 200 feet (> 61 m)	> 60 m
Maximum gap between lights around perimeter of wind farm	1/2 mile (804 m)	900 m (approx.)
Maximum gap between lights in a grid or cluster formation	1 mile (1.6 km)	“One dominant wind turbine within the perimeter”, subject to assessment
Minimum height* requiring two lights on top	> 499 feet (153 m) (lights to be installed on <u>ALL</u> turbines)	> 150 m (still following above methodology)
Placement of two lights	Horizontal, on opposite sides of nacelle	Vertical, stacked on top of each other, or separated by at least 1 m
Both lit?	Yes	No, 2 nd is back-up
Minimum height* requiring side lights	> 699 feet (213 m)	> 150 m

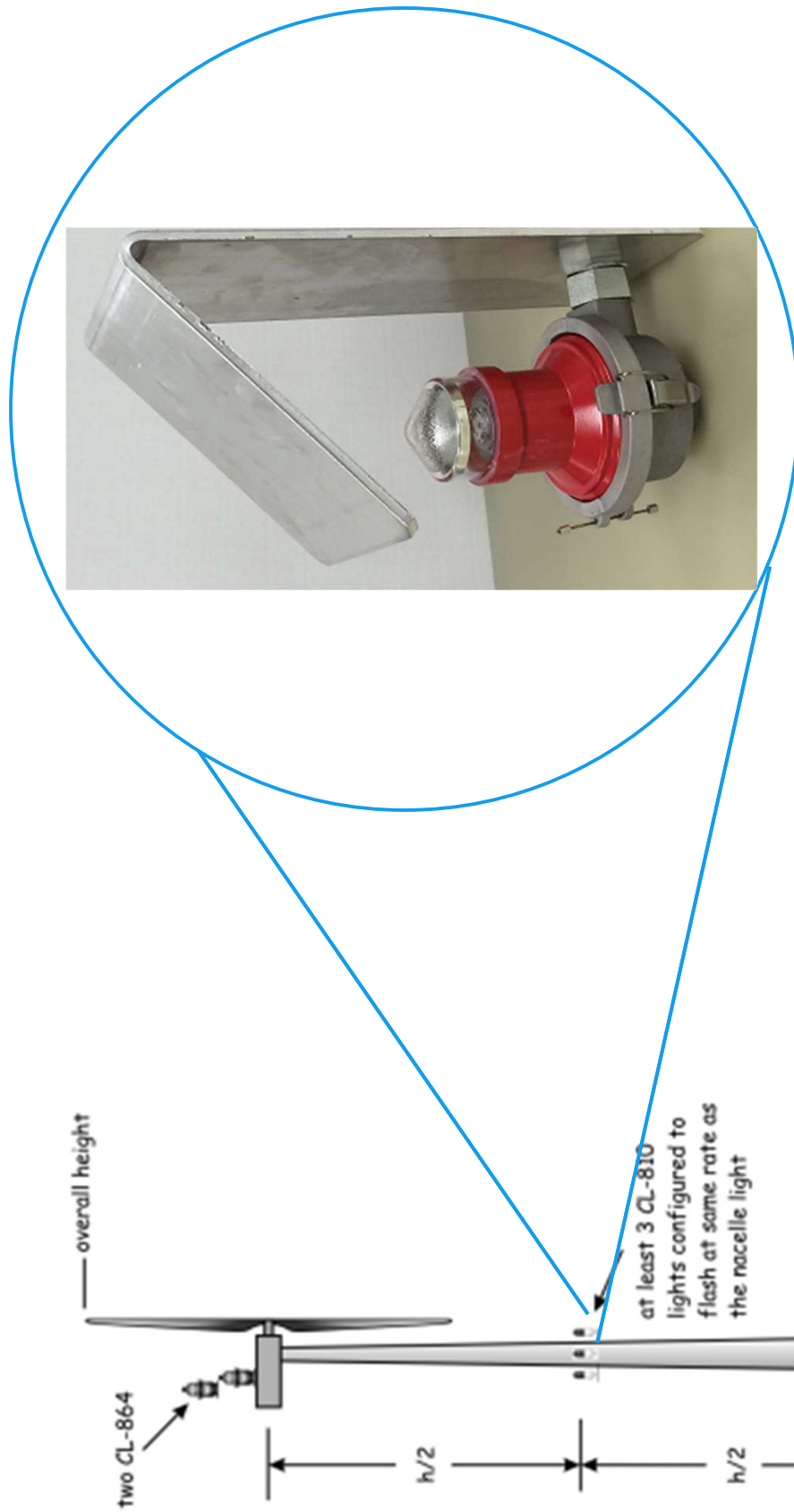


*Maximum blade tip height above ground

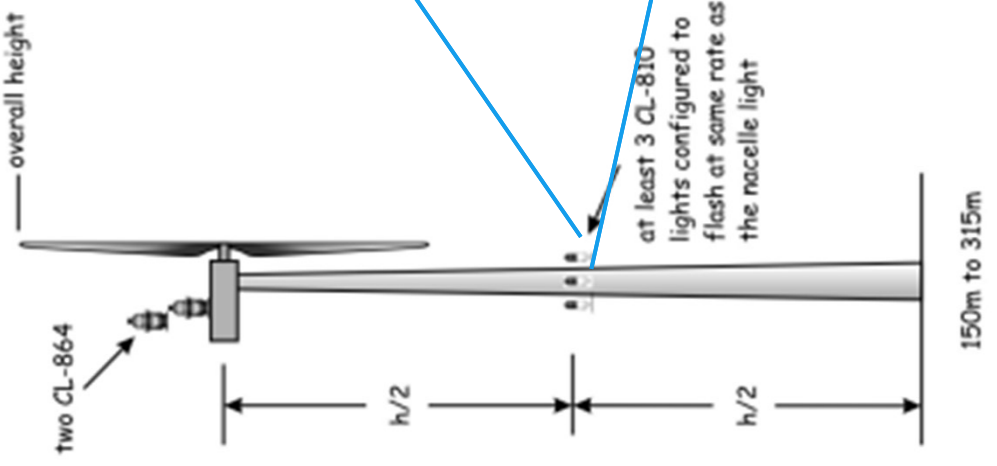
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SIDE LIGHTS – PRELIMINARY MODEL



SIDE LIGHTS – «ÉCLIPSE» MODEL MAKES IT EASY!





LIDS™ (Lighting Intensity Dimming Solution)

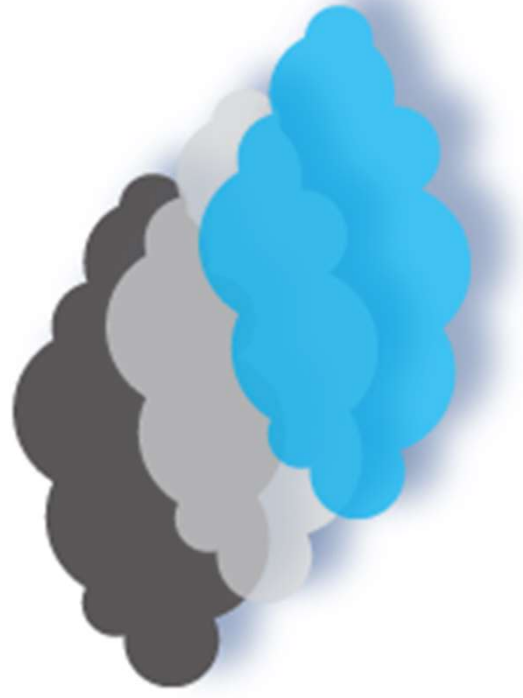
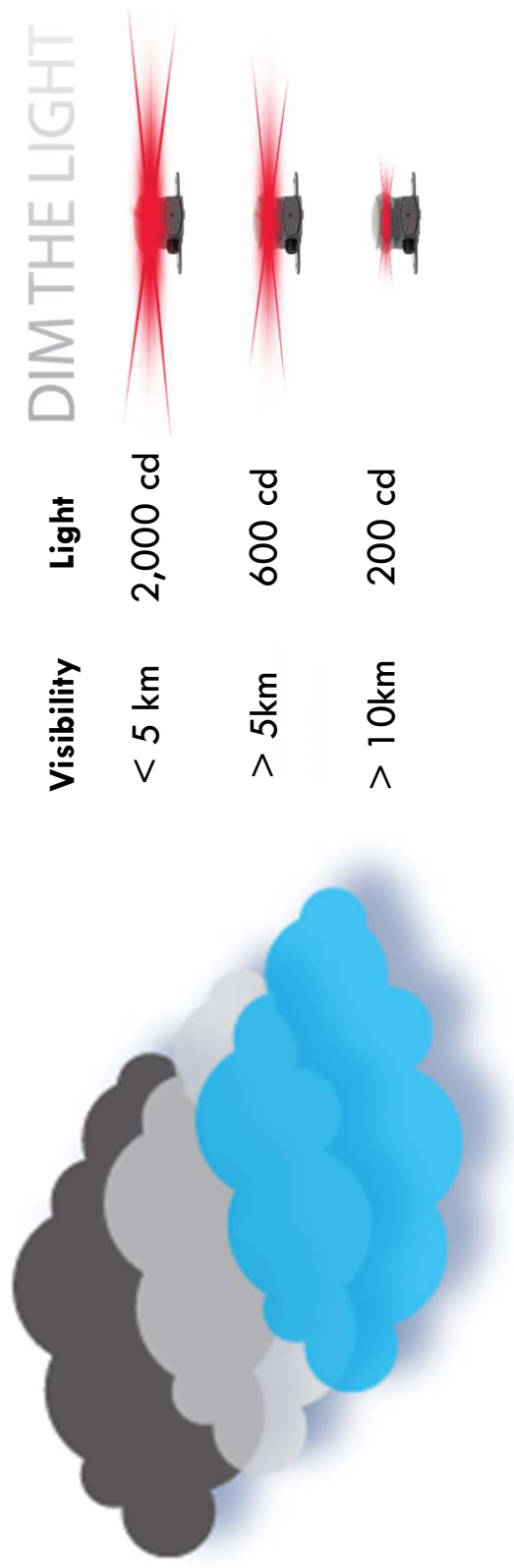


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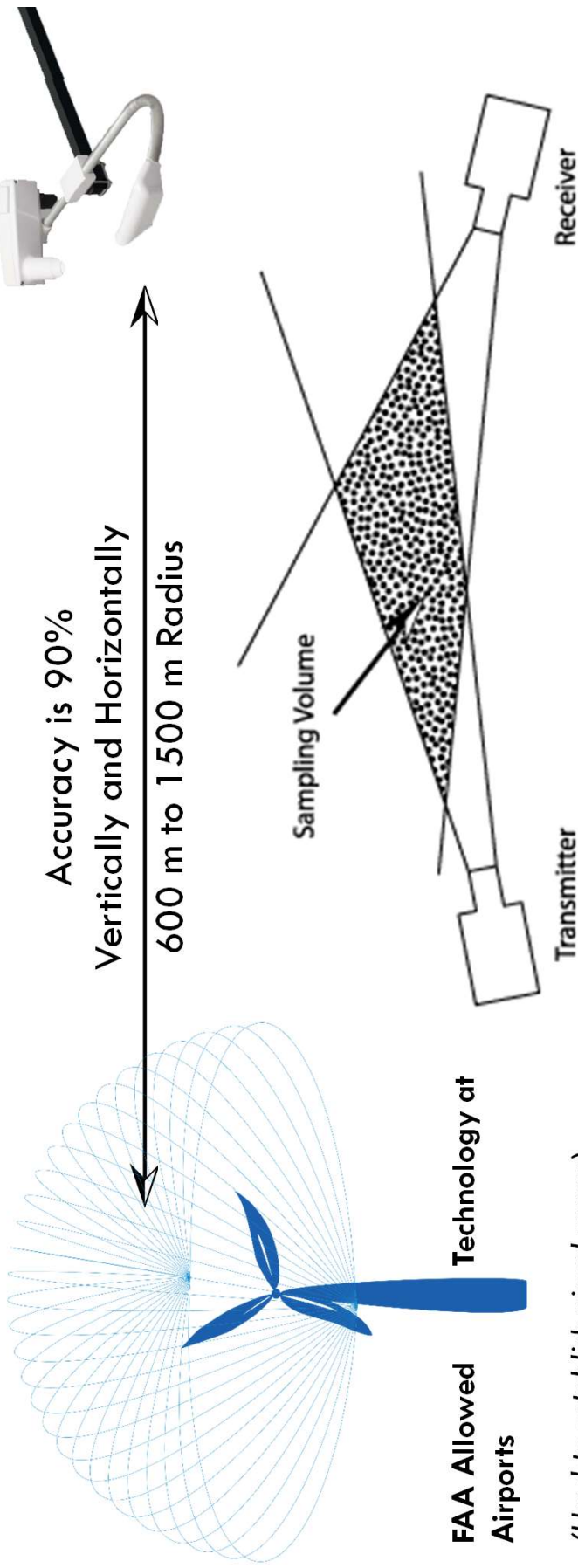


□ Light Intensity Dimming Solution **LIDS™**



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□ What is the technology – how does it work?

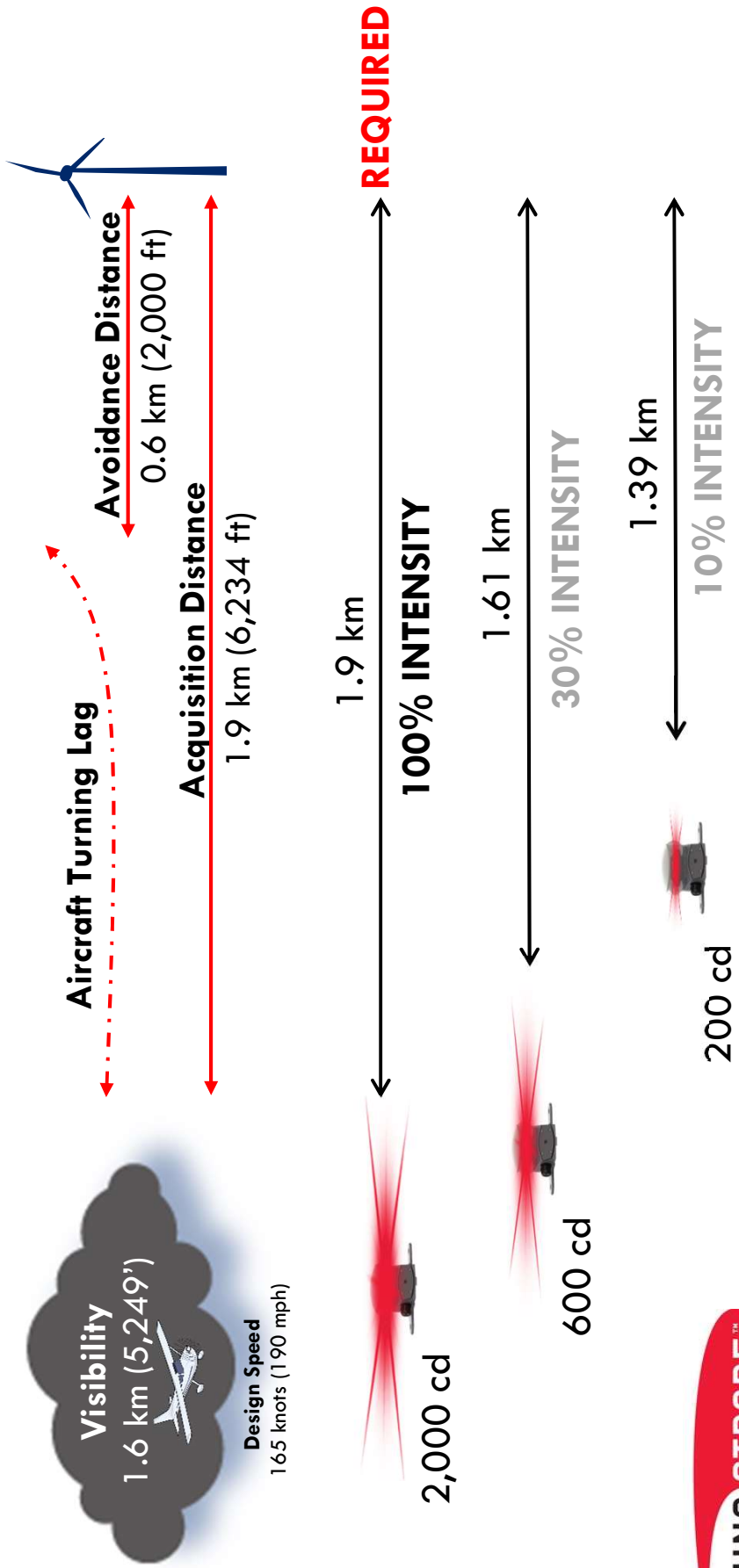


FAA Allowed Airports
 Technology at
 (Used to establish visual range)
FAA-E-2772B 3.1.2.2 Visibility Sensor (VS)



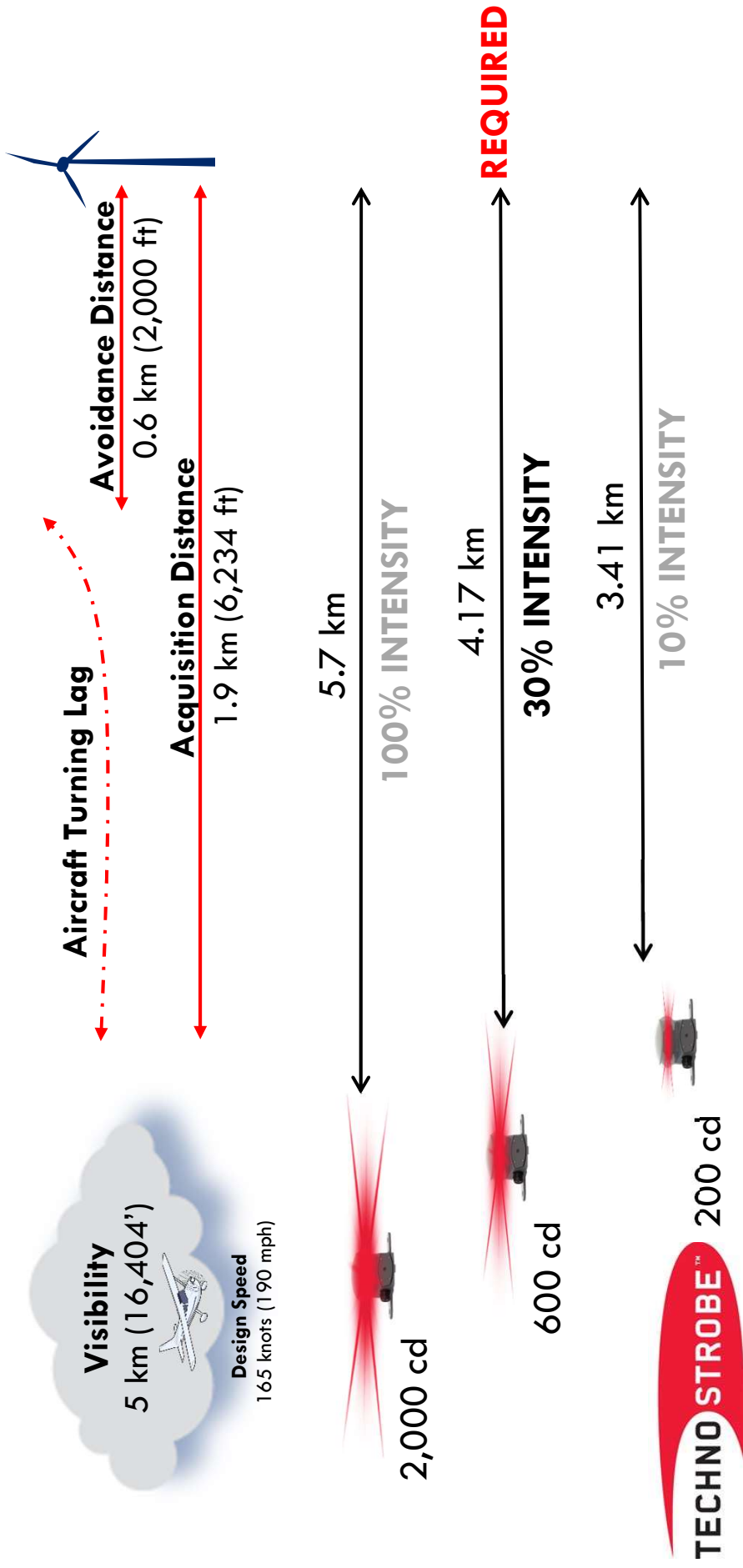
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□ Why is LIBS safe at < 5 km visibility?

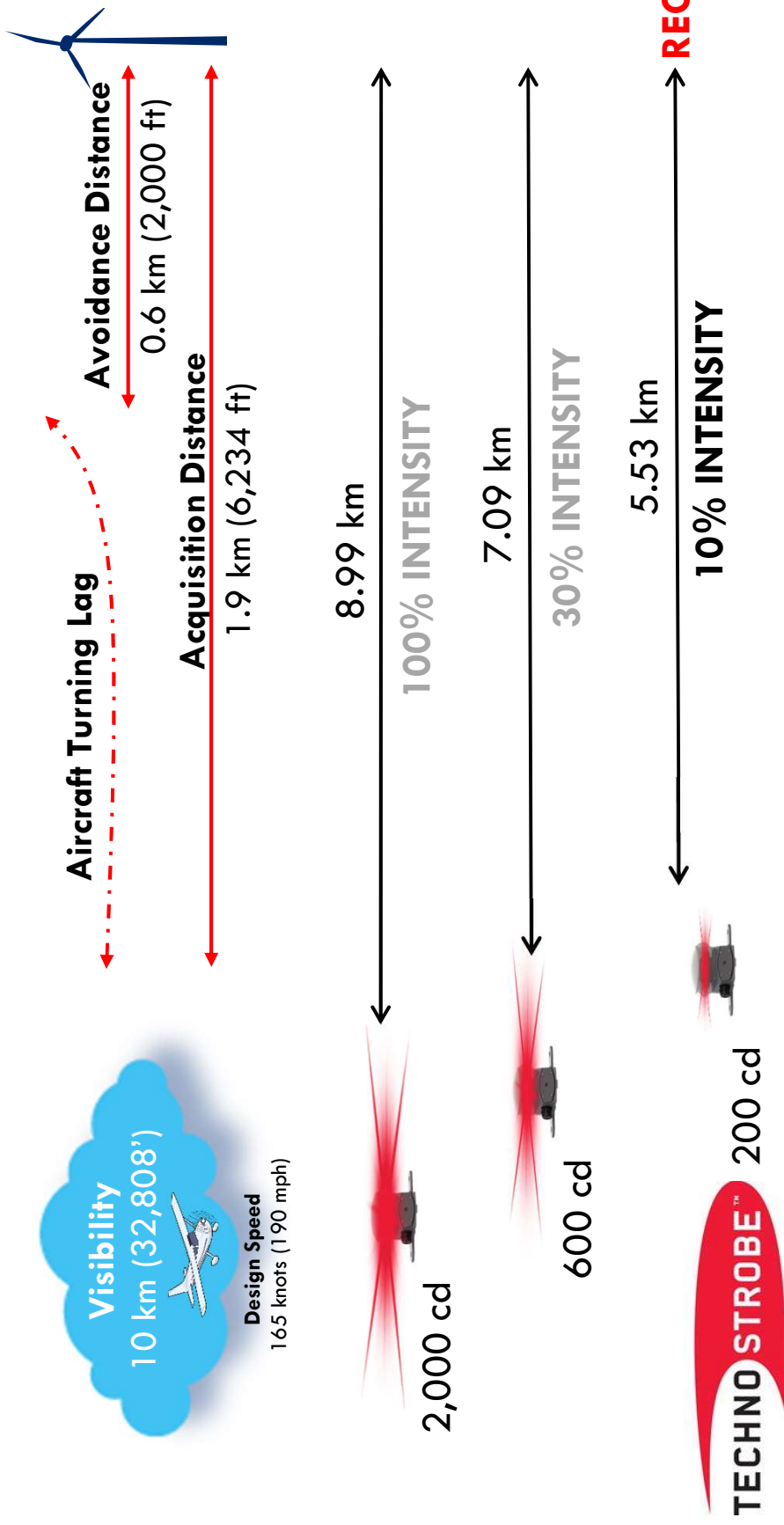


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□ Why is **LIBS** safe at > 5 km visibility?



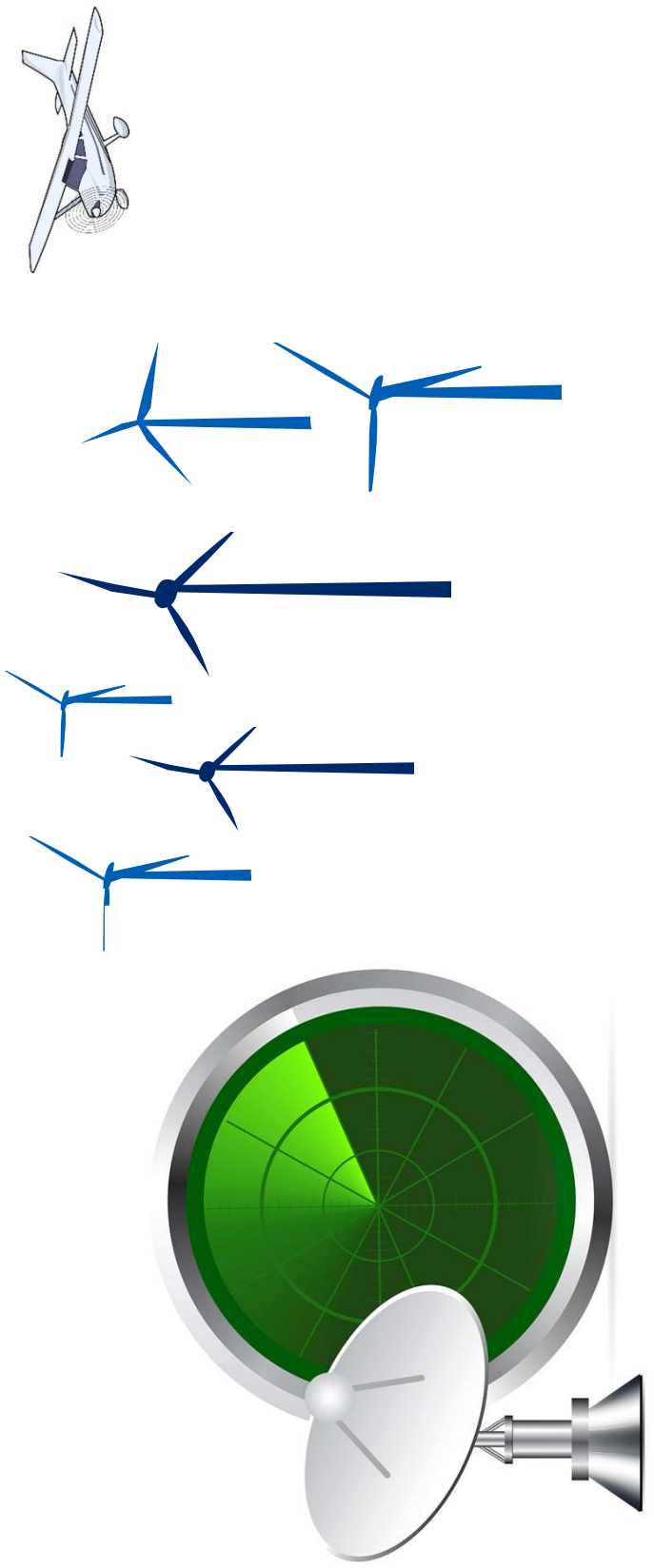
□ Why is **LIBS** safe at > 10 km visibility?



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□ Lighting Mitigating solutions - Radar



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- Compare with Aircraft Detection Lighting Systems (ADLS) (i.e. radar)
 - **LIBS** is less than half the incremental cost of radar
 - Radar operates lights at 0% or 100%, regardless of visibility, must default to 100% if there are any equipment faults
 - With planes in the air, radar is on at 100%, **LIBS** will set the lights depending on visibility (down to 10% on clear nights)
 - Daily monitoring and logging required for both systems
 - O&M costs are much lower (zero) with **LIBS**

- North Dakota House Bill 1378
 - By Jan 1, 2019, rules must be implemented related to light-mitigating technology systems for all wind farms
 - All new wind farms with certificates of site compatibility (certificates) issued after June 5, 2016 must be equipped with light-mitigating technology systems by Dec 31, 2019
 - All new and operating wind farms with certificates issued before June 5, 2016 must be retrofitted with light-mitigating technology systems by Dec 31, 2021
 - <https://nawindpower.com/new-legislation-lights-north-dakota-wind-farms>

Attachment B



LIDSTM Technology

Dim the light

See wind farms in a whole new light

Obstruction lights on wind farms are necessary for the safety of pilots and travelers. When at maximum intensity, the lights facilitate navigation during the worst visibility conditions. However, under clear skies, the lights can be too bright for the purpose they serve. Thanks to LIDSTM Technology, light intensity can now be tailored to suit the surrounding visibility. And that's good news for everyone. In the air, and on the ground.

TECHNO STROBETM See the Light

technostrobe.com

Combines visibility measuring devices with LED lighting equipment.

LIDS™ Technology is a trademark of Technostrobe inc. 2016. All rights reserved.

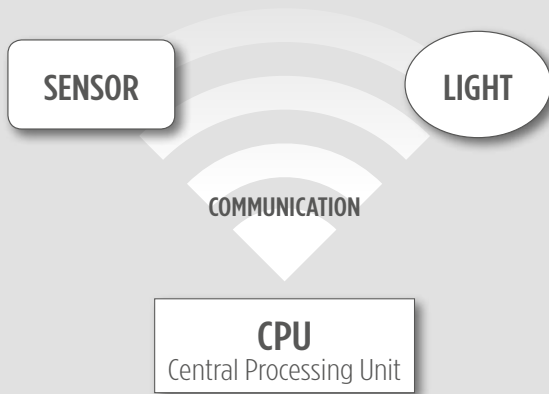
LIDS™ Technology. Community-friendly dimming solutions.

The Context. The presence of obstruction lights on tall towers is necessary for the safety of both pilots and travelers. These lights are set to flash at a maximum intensity to provide pilots with the necessary guidance when navigating through the worst possible visibility conditions - all night, all year round.

The Solution. LIDS™ Technology now provides a means of tailoring the intensity level of the lights on a wind farm in accordance with the surrounding visibility. The purpose of the solution is to dim the lights under clear sky conditions. In fact, under great visibility conditions (10 km of visibility or more), the intensity of the lights is reduced by 90 percent.

The Result. Using this leading-edge technology can help developers obtain a greater level of community acceptance for their projects.

LIDS™ Technology



Features

- Safe, simple, effective and cost efficient
- Proven technology
- Manufactured by wind industry experts in lighting and meteorology
- Web interface can provide feedback to the community in real time



Constructed by



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