



ORLANDO Airport: **Energy Saving** *with Dimmers on high masts*

*IES Aviation Lighting Seminar
Wilmington – North Carolina – 2011*



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Oct. 2011 (GD)

SUMMARY



- 1. Start up of this cost saving project***
- 2. Installation of a dimmer, at GOAA site***
- 3. Objectives***
- 4. Current results***
- 5. Upgrades***
- 6. Conclusions***





1. Start up of this COST SAVING PROJECT

*IES - ALC 2010, in New Jersey
Discussions on future RP-37 !*

→ Thanks to these seminars

1st meeting between :

Greater Orlando Airport Authority

Frank BARCZAK & Jeff PACE



& AUGIER – Gil DAVER

Discussion for a real test on high masts in Orlando airport

- * **Augier** to provides a **dimmer 480V – 3 phase**
- * **GOAA install** dimmer for apron light and
follow its operation during 6 months (summer 2011)



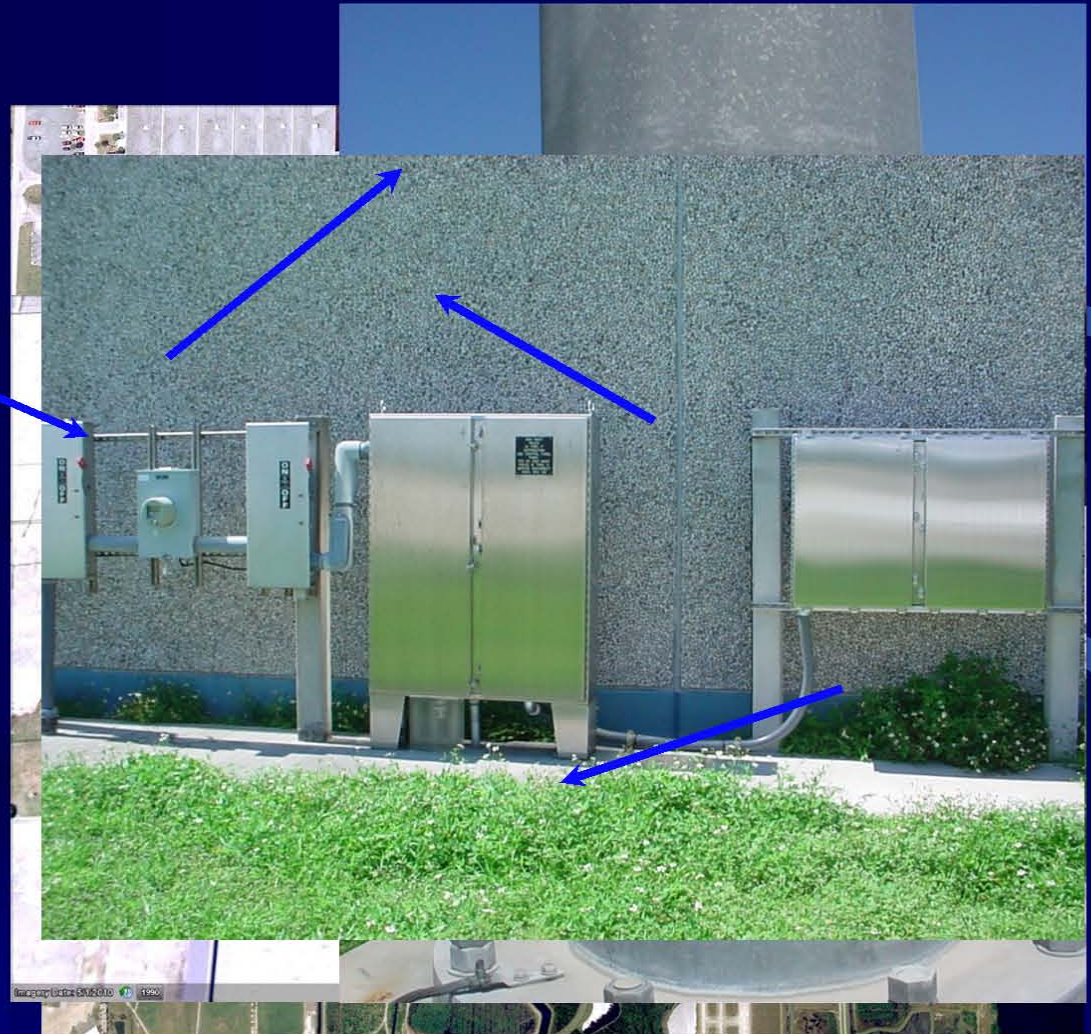
2.1 INSTALLATION of the DIMMER ORLANDO airport

Location at Orlando

« Corner » of the apron

*Power supply of
2 high masts with 12 HPS
→ Total of 24 kW*

*New cabinet beside
The existing feeder pillar*





2.2 INSTALLATION of the DIMMER ORLANDO airport

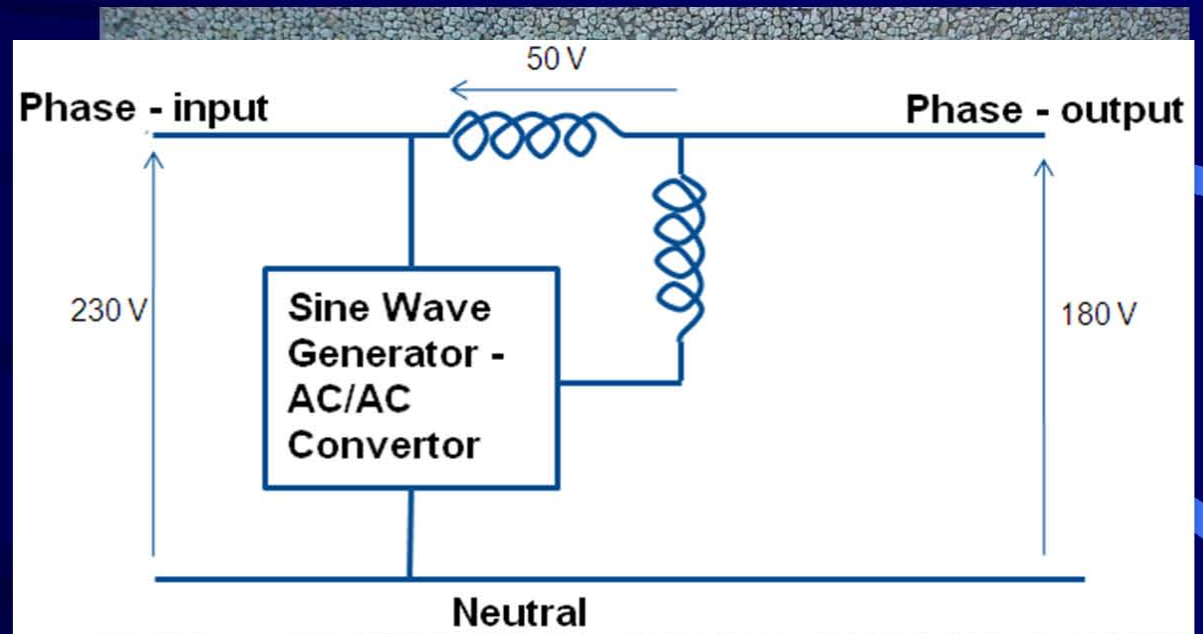
AUGIER constraints:

Upgrade of DIMMERS from 230 to 480V:

*Development of an auto-
transformer 480/230V
to keep existing
electronics (2 years)*

*Supplied of **3 dimmers**
9kVA between 2 phase
at 480V.*

+ an Augier GSM modem





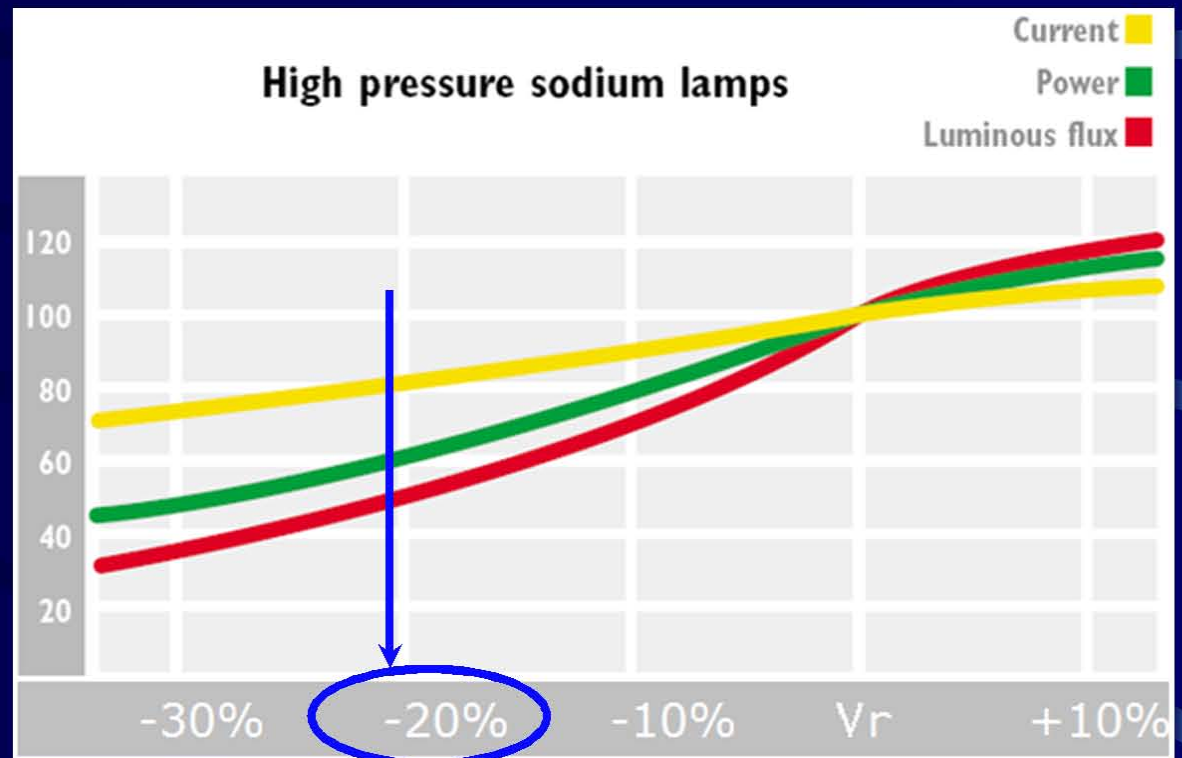
3.1 OBJECTIVES

*REMINDER on
DIMMERS operation
on H.I.D. lamps*

Starting from $V_r = 480\text{ V}$

$V_r - 21\% = 380\text{ V}$

→Pr # 50% for HPS



Guidelines on the Application of Dimming to High Intensity Discharge Lamps

A NEMA Lighting Systems Division Document (LSD 14-2002)

« ... generally **not lower than 50 percent** of rated lamp wattage.”



3.2 OBJECTIVES

Current TECHNICAL RULES

4/22/88

AC
150/5360-13

Table 4-1. General Lighting Requirements

Area	Foot-candles (LX) ²
Fences, gates, guard-shelters, building exteriors, apron areas, associated equipment parking areas, building entrances, and exits.	5.0 (54.0)
Pedestrian entrances to aircraft operations area ¹	2.0 (22.0) max.
General aircraft operations area ¹	0.15 (1.6)
Dock Areas	10.0 (108.0)
Roadways	1.5 (16.0)

¹ FAA AC 107-1, Aviation Security-Airports.

² Measured at most remote points of areas involved, ± 200 ft (60 m) 36 inches (91 cm) above ground; light target perpendicular to the direction of the light rays.



3.3 OBJECTIVES

Both TECHNICAL & FINANCIAL

1) Anticipating the new release of RP-37

- "Recommended Practice for Outdoor Lighting for the Airport Environment » *to be published on 2012 !*

2) Checking the Robustness of the dimmer

- With the wonderfull weather of Orlando including *electric storms, high temperatures* and the *salty & humid ambient air* ...

3) Users' interface for maintenance operations

- Connexion with a notebook to collect the *states & parameters*.

4) Cost saving with power price in Florida

- Real measurement of *power consumption*





4.1 CURRENT RESULTS

REAL & ECO 395 V	Input Vac	Current A	Power kW	Current A	Power kW	Saving %
Phase B-C	472.7	22.6	6.0	17.5	4.7	21,7%

NOM. & ECO 380 V	Input Vac	Current A	Power kW	Current A	Power kW	Saving %
Phase B-A	480		6.24	14.8	4.1	32%

2) Real measurement inside the cabinet:

- Done with a power analyzer HIOKI 3196
 - More than 20% of instant « cost saving » with rated voltage (395V)
- **Should be more than 30% with reduced voltage at 380V**



4.2 CURRENT RESULTS

FINANCIAL ANALYSIS

1) COST SAVINGS at GOAA:

- *Local price of the airport lighting electricity = US\$ 0.0988 / kWh*
- *Annual consumption of this cabinet 48 kW is # **US\$ 15,000***
- *Annual cost saving will be #25% → # **US\$ 3,750.00***

2) RETURN OF INVESTMENT:

- *Indicative price of a 54 kVA dimmer# US\$ 28,000.00*
- *R.O.I. is # **7 years** with this current price of electricity*
- *Less time if the power price continues to increase in Florida*



5.1 UPGRADES

For a potential use by operation in Tower

1) Operation with the GSM Modem:

- *Back to nominal voltage and light during cost saving*
- *By sending a SMS or a command from the SCADA*

2) Development of the range of DIMMERS:

- *Adaptation of the Serie DIMMERS with only one common auto-transformers*
- *Other North American voltages (347-600V, ...)*

3) More cost saving using Astronomic clocks:

- *Avoids maintenance cleaning on photocells & provides constant operation*





5.2 UPGRADE

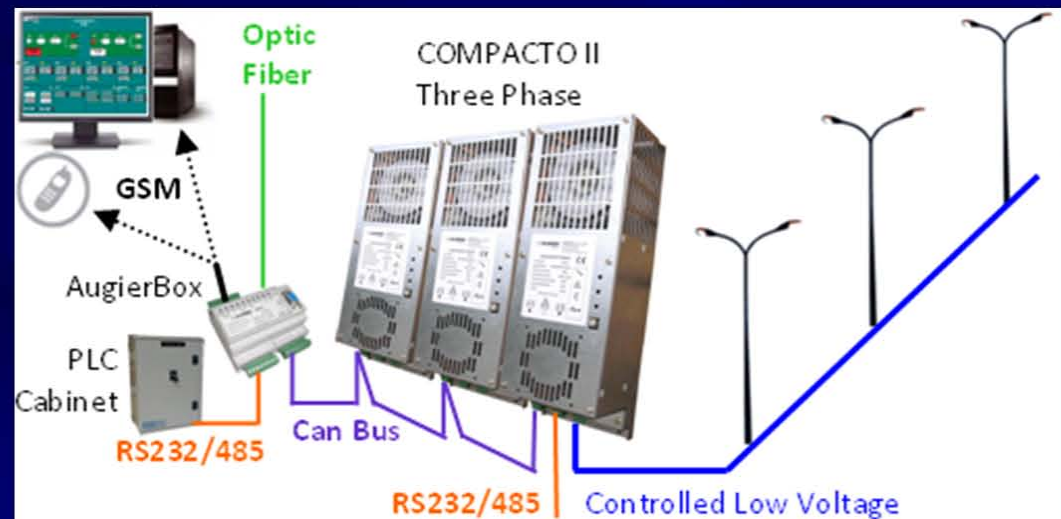
Remote control from ATC

Optimisation of the platform lighting

- *When no operation around an aircraft → decreasing light*
- *When an aircraft is landing → increasing light at its future position*

Weather surprises !

*In case of bad weather,
that is very easy to
have the light back
to the RATED value*





6.1 CONCLUSIONS

TECHNICAL

Technical issues:

- *Compacto dimmers requires **external lightning arrestors** and to be installed **inside a cooled cabinet** despite the fact that they operated correctly during June without these protections.*
- *Augier after sales reactivity is correct (from France at this time).*
- *PC software allows good maintenance actions.*

6.2 CONCLUSIONS



R.O.I. & CARBON Production saved

GREEN INFO			Lighting	Reduced	kVAh saved	Carbon balance
			ON	Power	per year	CO2 Tons (10 years)
Dimmer 1 phase	9	kVA	4 200 h	3 000 h	13 500	12
Dimmer 3 phase	36	kVA	4 200 h	3 000 h	54 000	49

CARBON production saved:

- *Annual kVAh saved per year*
- *Carbon balance on a 10 years period*
- *2 examples : 9 kVA / 36 kVA*



6.3 CONCLUSIONS

→ **Where cost savings are !**

1) Apron

(Manual part IV §13: 20 -> 10 lux)

2) Parks

3) Roads

4) Terminals

Marseille Provence

5 x 27 kVA (Apron)

1 x 36 kVA (Park)

Lyon St Exupery

1 x 27 kVA (Park)

Bâle - Mulhouse

2 x 9 kVA (Park)

Nice Cote d'Azur

1 x 18 kVA (Access T1 + Park)

1 x 108 kVA (Access T2)

Toulouse – EADS zone

1 x 6 kVA (Apron)





... Thank you for your attention

Think about them !!!

Prepare the future of our children ...



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