

IESALC - Wilmington - 2011

IESNA RP-37

Recommended Practice for Outdoor Lighting for the Airport Environment, Update



*2011-IESALC
Wilmington, NC*

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IESALC Recommended
Practices Subcommittee

Recommended Practice for Outdoor Lighting for the Airport Environment

- Agenda
 - Committee Members
 - History
 - Document coordination
 - New items
 - Areas on Apron, light levels, obtrusive light
 - Drawings & Images
 - Some Example
 - References
 - Conclusion

Committee Members

- Heathear C. Johnson, Hubbell
- Heather Mckee, Denver International Airport
- Fred Loeffler, RW Armstrong
- Mike Tebeau, Lambert-St Louis International Airport
- Irwin Smiley, AECOM
- Alfred Seiterle, Aeroplan Engineering
- John Wujek, RW Armstrong
- Richard Larivée, Avia Rupta Solutions

Committee Members

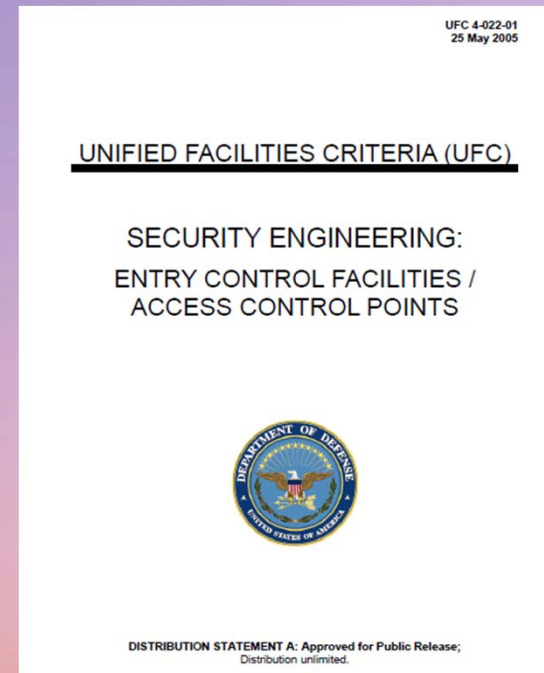
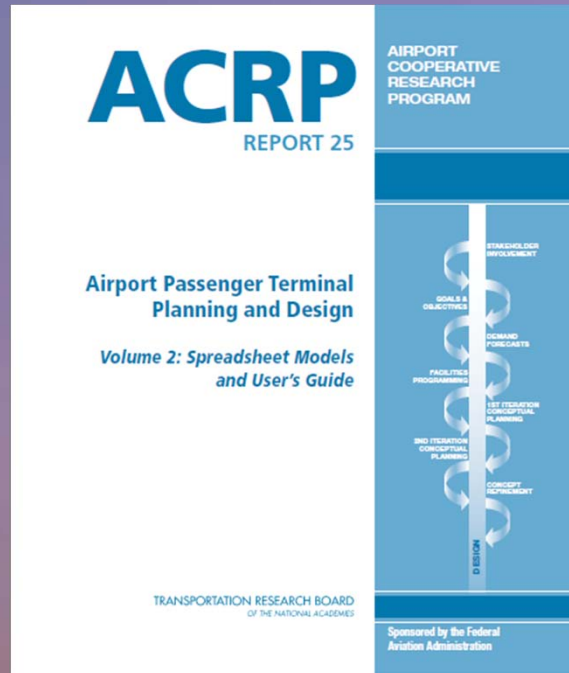
Special thanks

- Support
 - Carl S. Johnson- Avcon
 - Dawn De Grazio - Lighting Analysts, Inc.
- Meeting rooms
 - Frank Barzack – Orlando International Airport
 - Heather McKee – Denver International Airport

History

- 1987 Publication of RP-14 and RP-17 (1968)
- March 2008 subcommittee kick-off
- End of 2010 - document sent for comments
 - 200 comments, January 2011, 150 e-mails and 20 responses
- March and May 2011 review of comments
- June 2011 task force for light levels and zones
- August 2011
 - Glare: concept, limits and tool
 - Pictures, drawings, introduction, foreword
 - Start end to end review
- Ongoing review
- Preparing for approval IESALC and IESNA board

Document Coordination



New Items

- **Areas of Apron**
- **Light levels**
- **Obtrusive light**
 - **Tower control**
 - **Pilot**
 - **General**



New Items

- Areas of Apron
 - 4 types: Commercial, GA, Cargo and hangar
 - Definition of aircraft stand, aircraft parked position & apron safety line
 - Spill light back of the plane
 - 5% max
 - a) Edge of the service road
 - or
 - b) 15 meters behind the tail

VISUAL AIDS for NAVIGATION

TP 312E

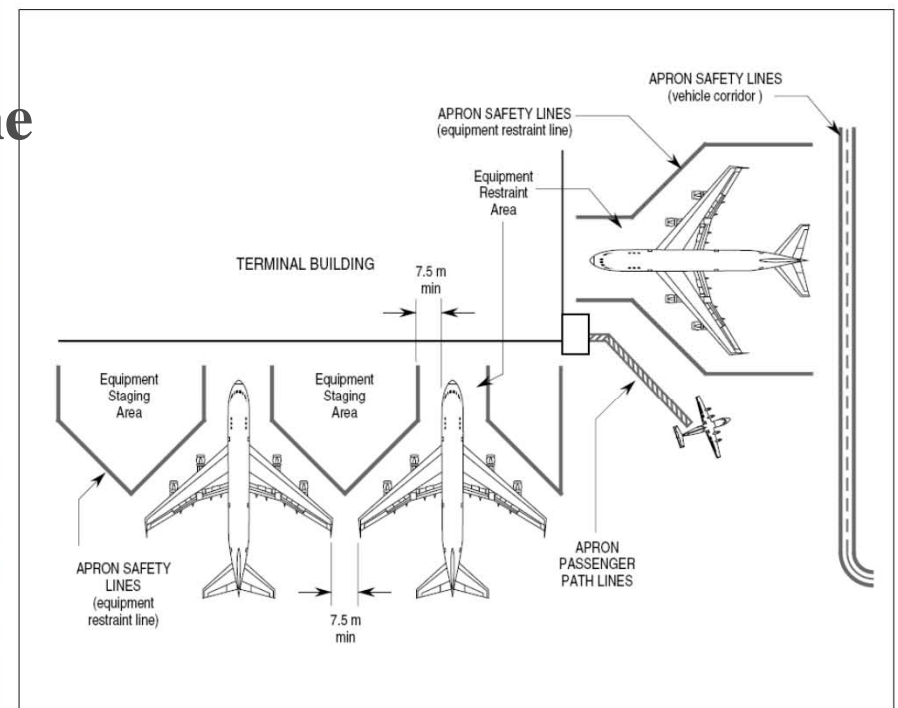









Figure 5-7. Examples of apron safety lines and passenger path lines

New Items

- Light levels
 - Based on activity and type of aircraft
 - Airplane design group (ADG)
 - 20 to 50 Lux

Airplane Design Group (ADG)	Maximum Wingspan		NBEG		
	Feet	Meters			
I. Small Regional	49	15	0.4		No. of Narrowbody Aircraft in wingspan of ADG I Aircraft = 0.4
II. Medium Regional	79	24	0.7		No. of Narrowbody Aircraft in wingspan of ADG II Aircraft = 0.7
III. Narrowbody	118	36	1.0		No. of Narrowbody Aircraft in wingspan of ADG III Aircraft = 1.0
IIIa. B757	135	41	1.1		No. of Narrowbody Aircraft in wingspan of ADG IIIa Aircraft = 1.1
IV. Widebody	171	52	1.4		No. of Narrowbody Aircraft in wingspan of ADG IV Aircraft = 1.4
V. Jumbo	214	65	1.8		No. of Narrowbody Aircraft in wingspan of ADG V Aircraft = 1.8
VI. Super Jumbo	262	80	2.2		No. of Narrowbody Aircraft in wingspan of ADG VI Aircraft = 2.2

Source: Hirsh Associates and Landrum & Brown

ACRP Report 25, Volume 1:Guidebook, Figure V-18.

Artificial Night Sky Brightness due to Light Pollution in North America

A preliminary picture of the growth from 1950 to 2025

Artificial night sky brightness at zenith, at sea level, for standard clean atmosphere as fraction of the average natural night sky brightness



Late '50

Middle '70

1997

2025

© 2001 Cinzano P., Falchi, F., Elv

<http://www.yosemite.org/naturenotes/NALightPollution.htm>

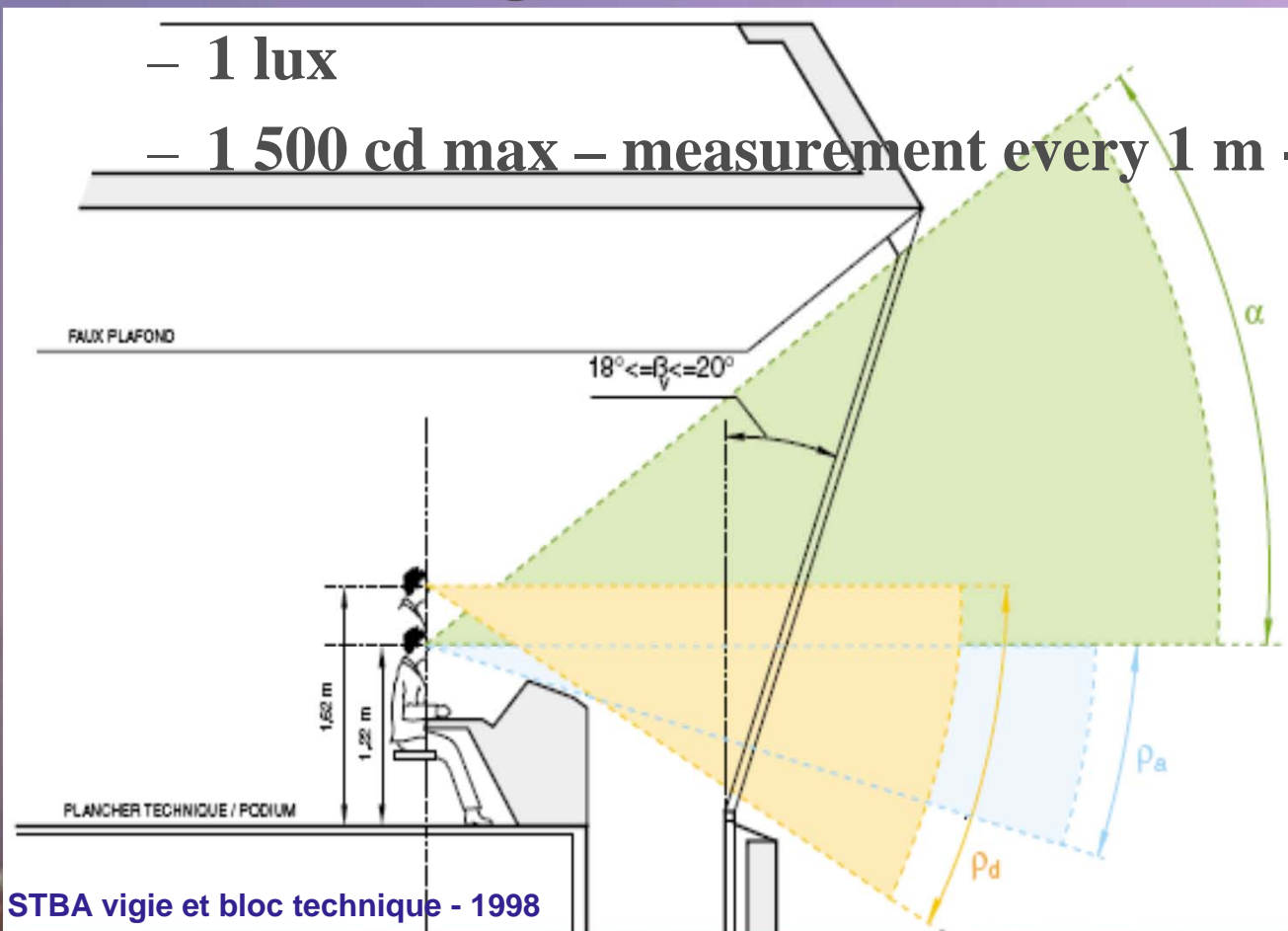


<http://calgary.rasc.ca/lp/whatislp.html>

New Items

- Obtrusive light - Tower control

- 1 lux
- 1 500 cd max – measurement every 1 m - 360 degrees

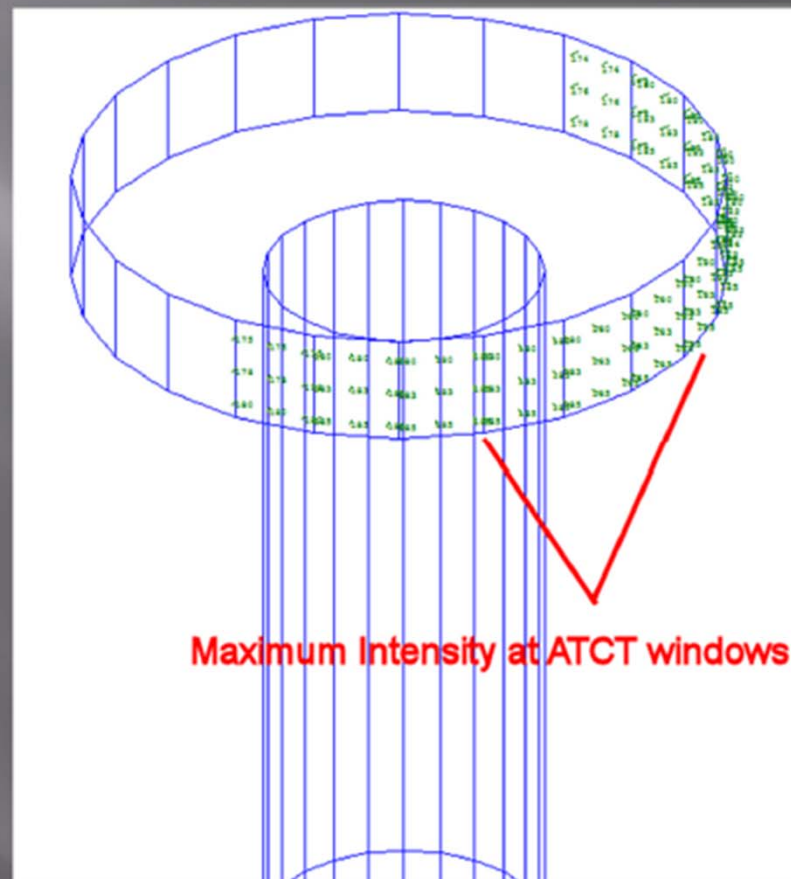


STBA vigie et bloc technique - 1998

New Items

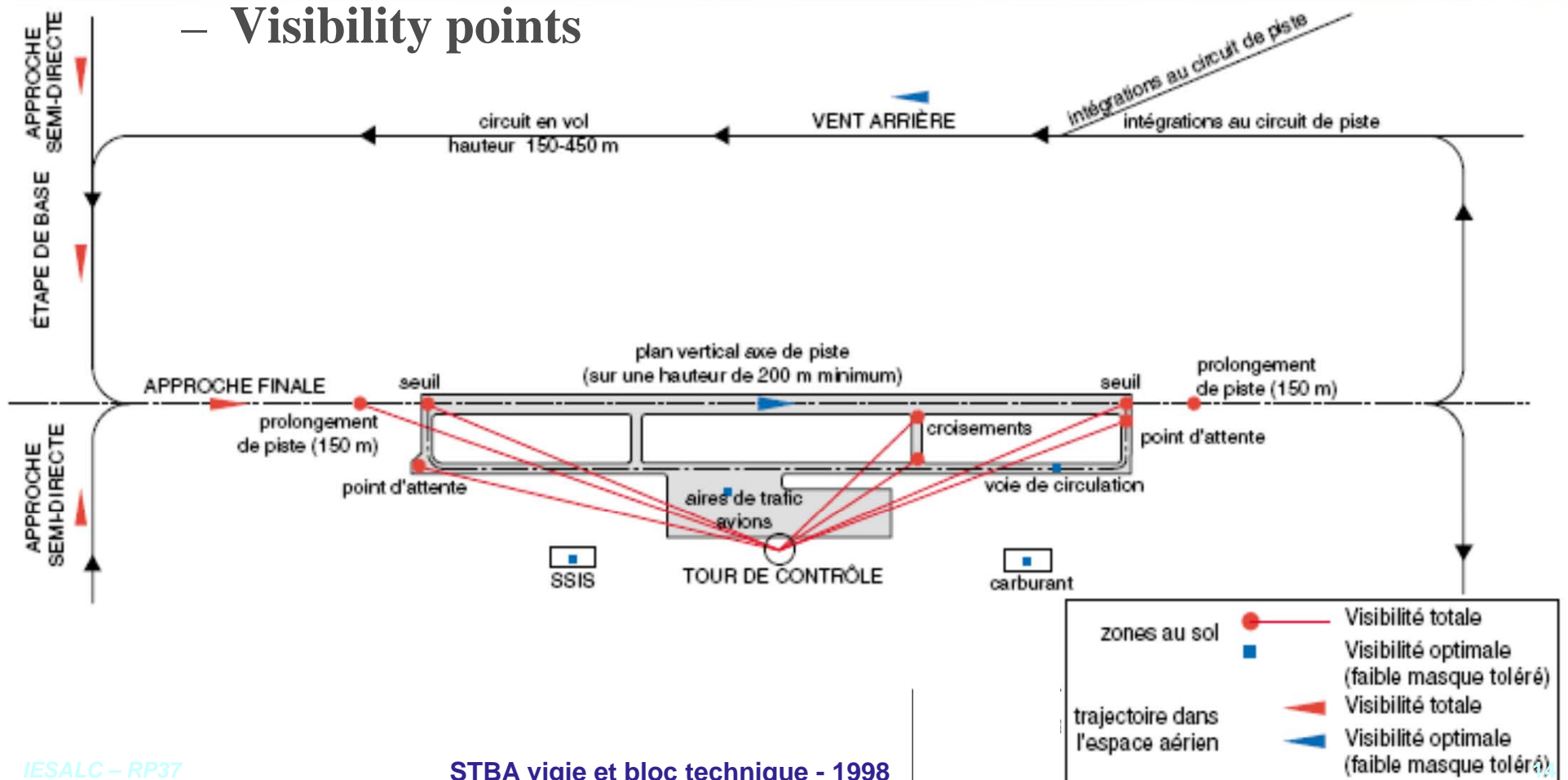
Examples in AGi32

Green grid:
Maximum
luminaire
Intensity as seen
at ATCT
windows, looking
in any direction.



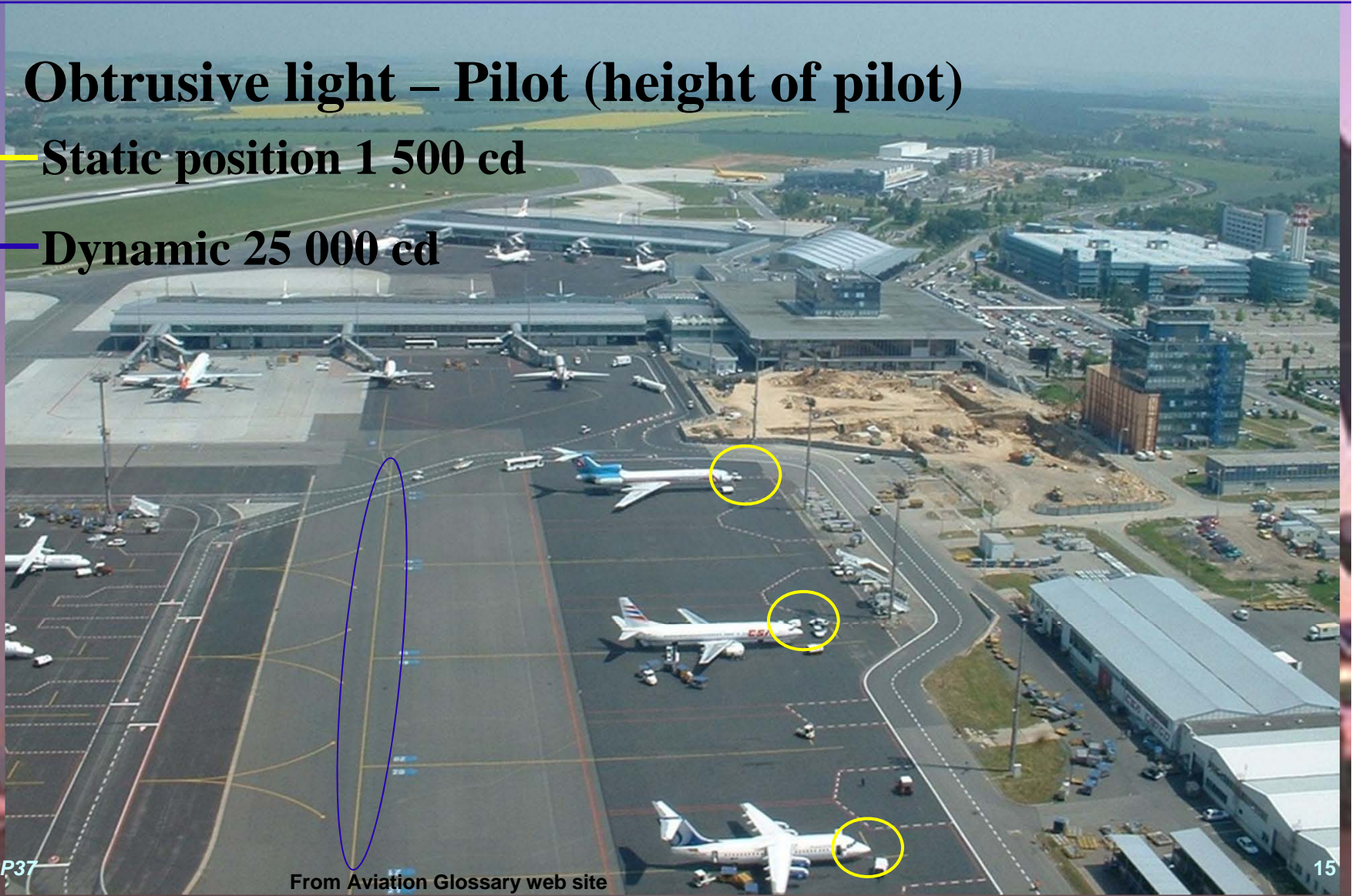
New Items

- Obtrusive light - Tower control
 - Visibility points



New Items

- **Obtrusive light – Pilot (height of pilot)**
 - Static position 1 500 cd
 - Dynamic 25 000 cd

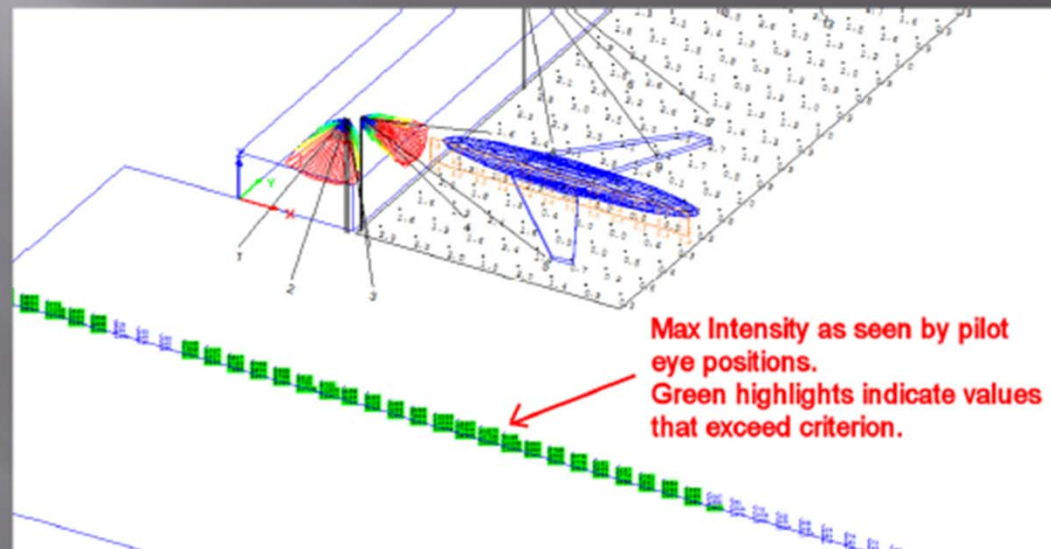


New Items

Examples in AGi32

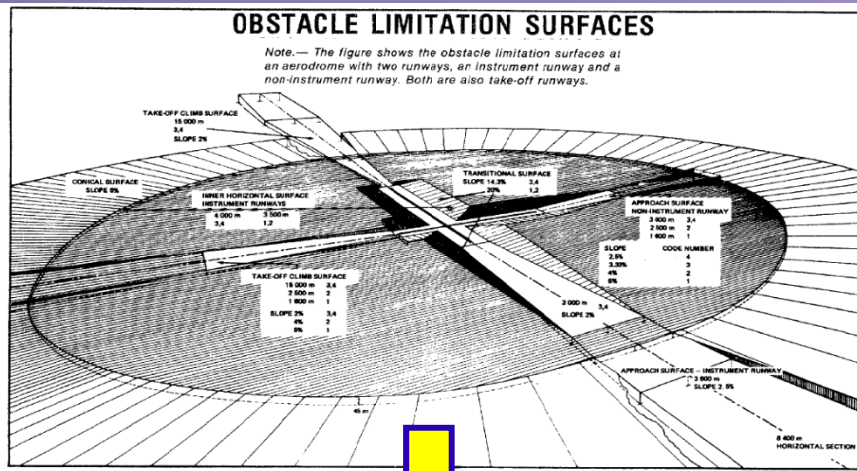
Blue grid:
Maximum
luminaire
Intensity as seen
at each pilot eye
position, looking
in any direction.

Green highlights
indicate where
the value exceeds
the maximum
allowed value.

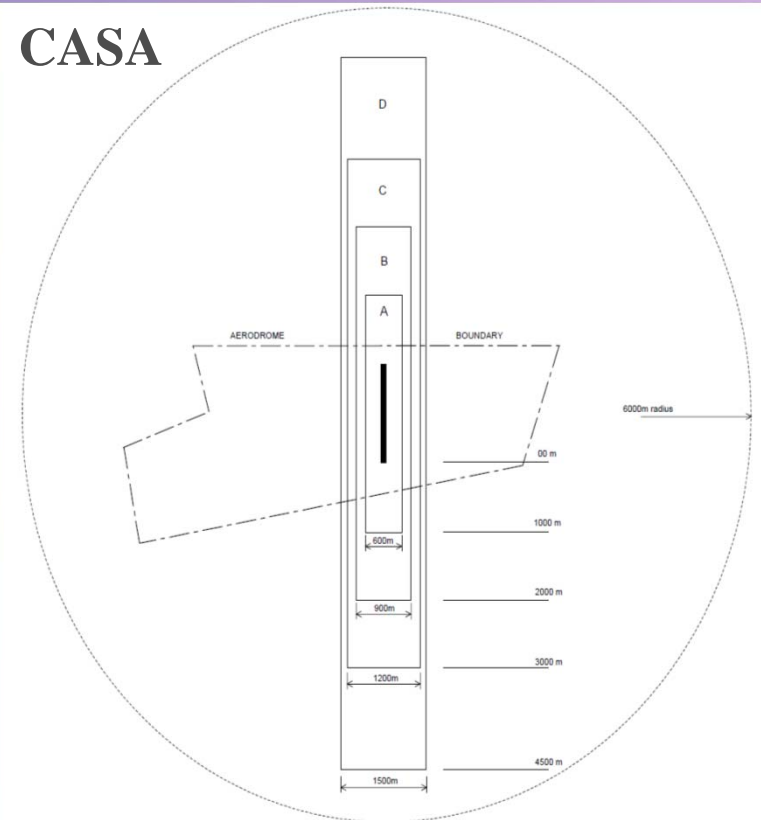


New Items

- Obtrusive light - Pilot



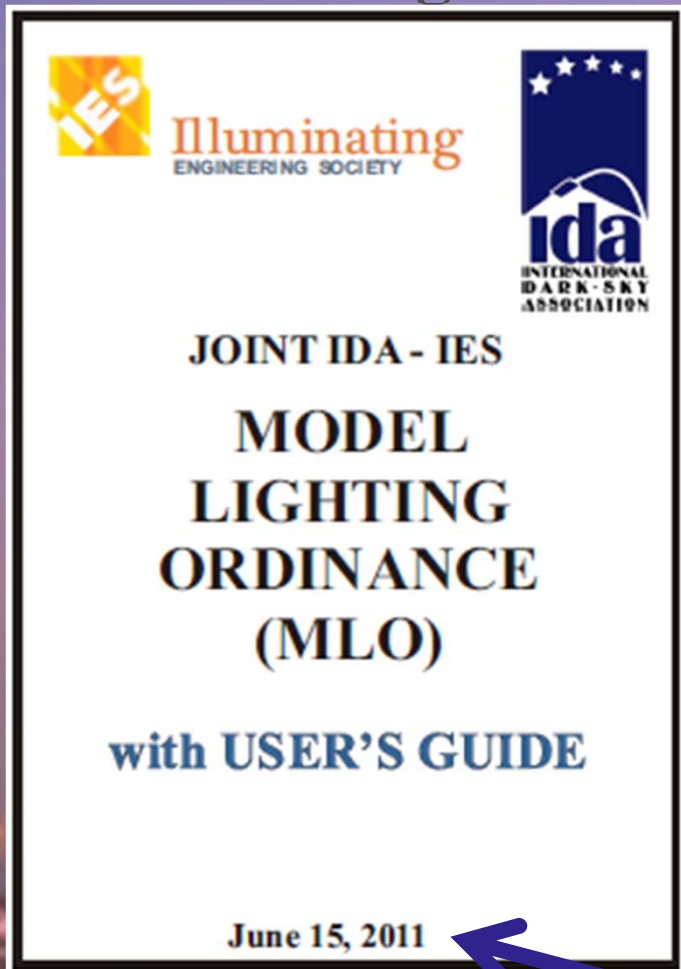
CASA



- 6 km radius
- Code of aircraft
 - 1 2 km threshold x 0.9 km
 - 2 and + 4 km threshold x 1.5 km
- No light above 90 degrees

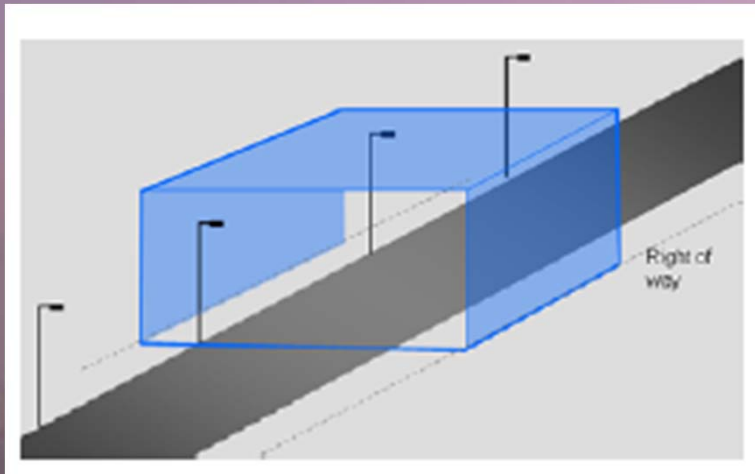
New Items

- Obtrusive light – General



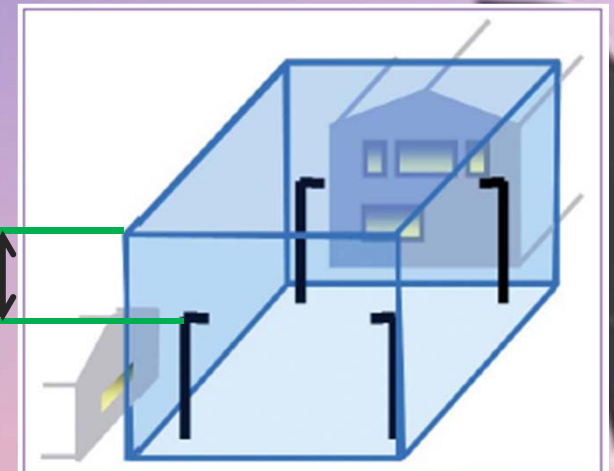
New Items

- Obtrusive light – OSP general concept
 - OSP – Outdoor site performance
 - Base on comparison
 - Built data



10 meter above tallest
luminaire

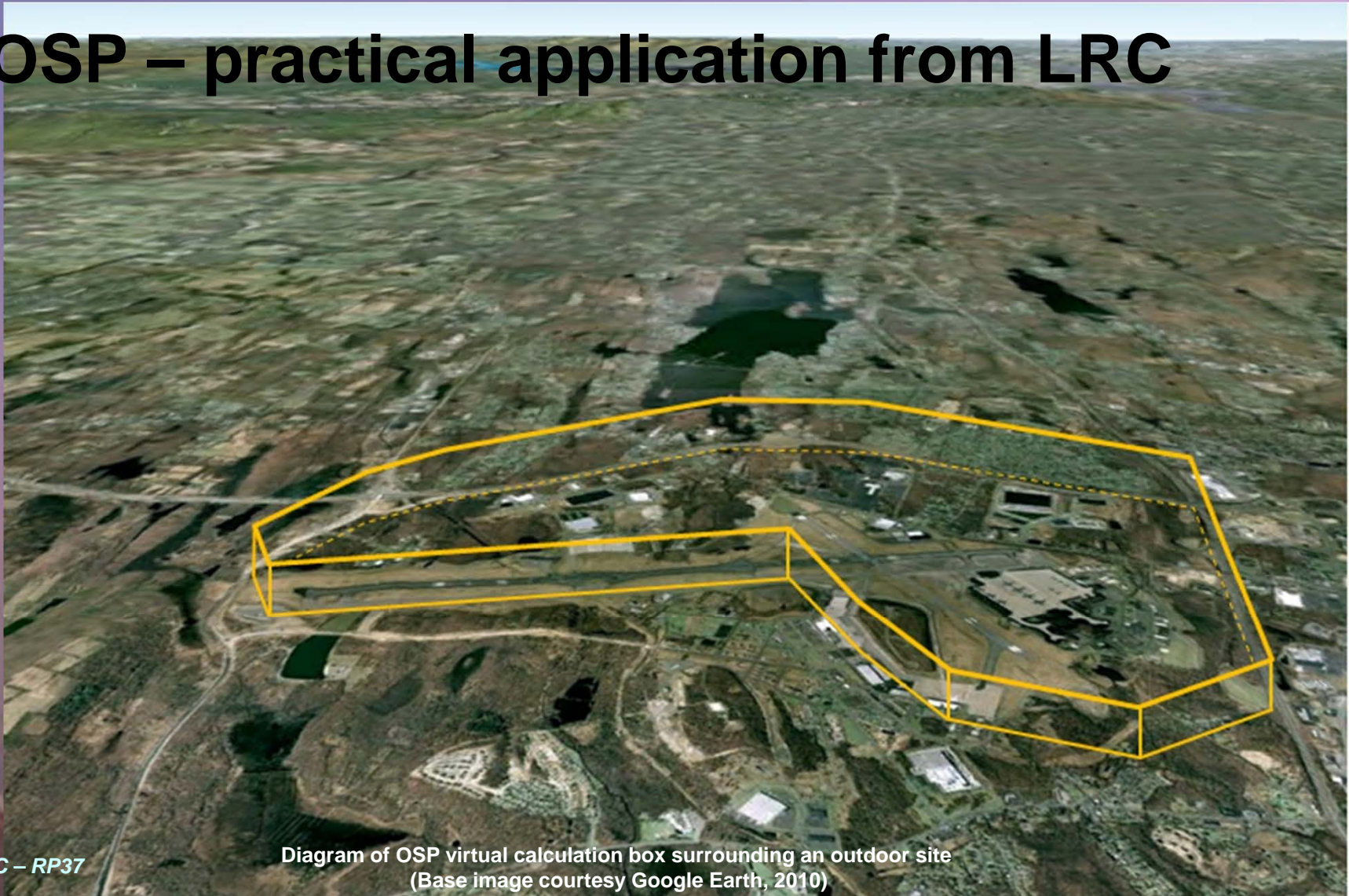
No LLF in calc



<http://www.lrc.rpi.edu/researchAreas/pdf/insidetheBox.pdf>

New Items

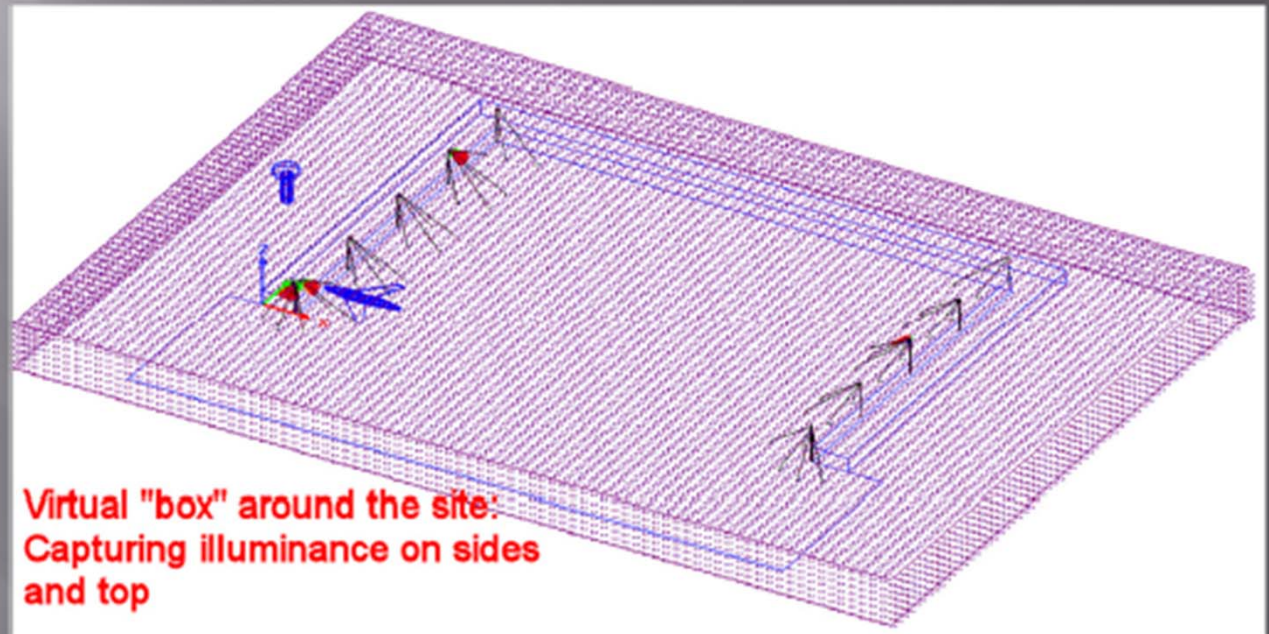
- **OSP – practical application from LRC**



New Items

Examples in AGi32

Purple grid: A virtual box is created around the site, capturing illuminance on top and sides.

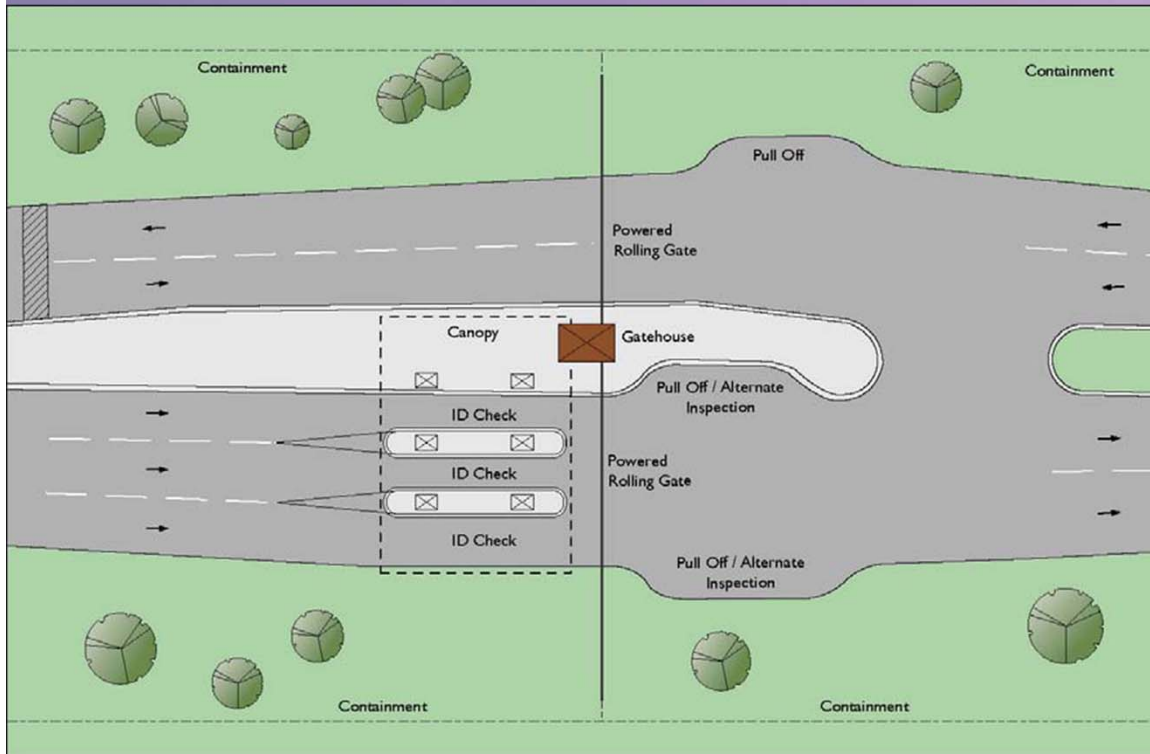


Virtual "box" around the site:
Capturing illuminance on sides
and top

Lighting Analysis

Drawings & Images

- UFC-4-022-01 Security Engineering Entry Control Facilities/
Access Control Point – Various values for functions

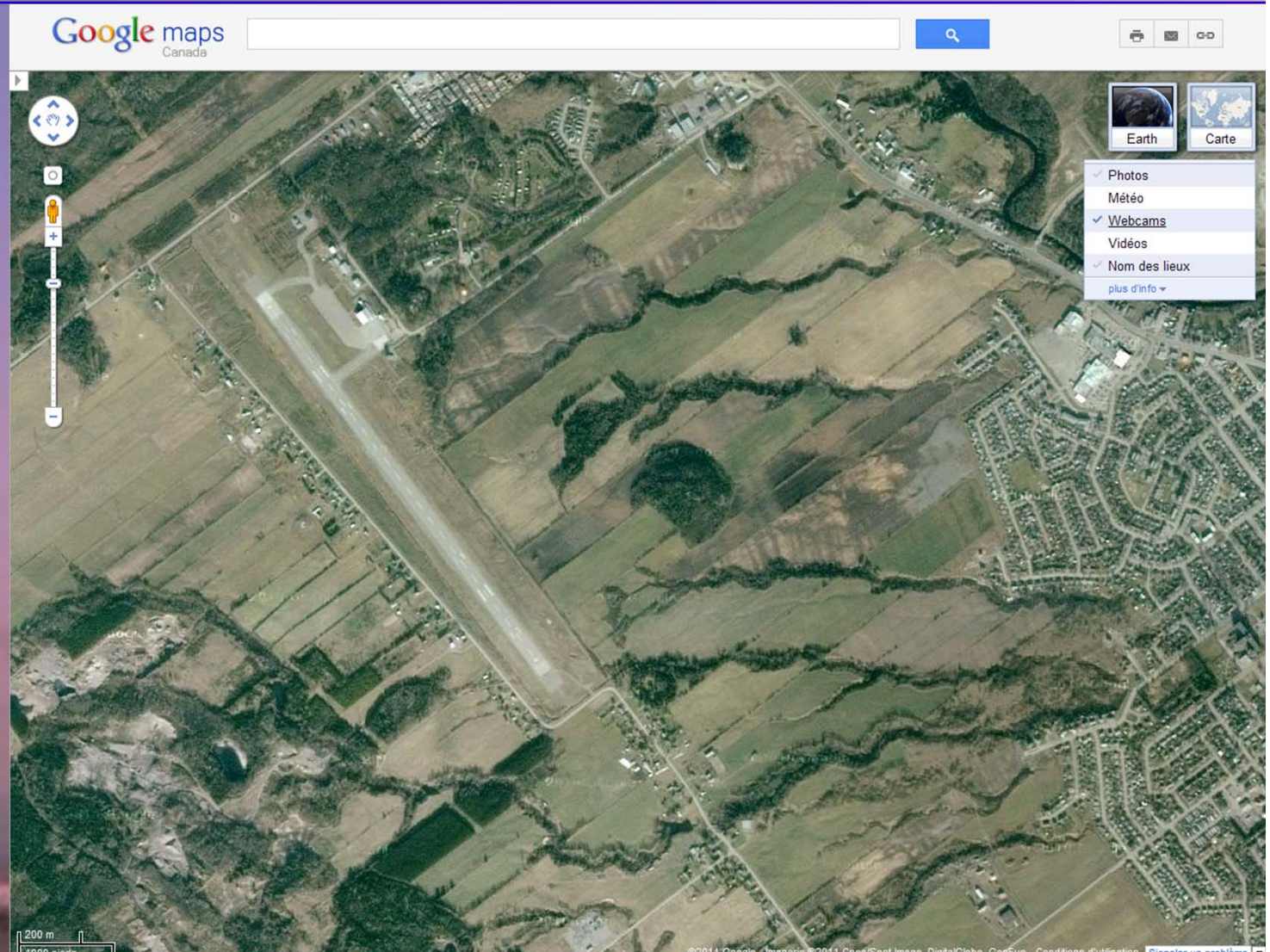


Application	Minimum Illuminance, footcandles (lx) at Ground Level*	Notes
Approach Zone and Response Zone	3 (30) Secondary Gates 3 (30) Primary Gates	Illuminance on the pavement and sidewalks
Search Area Parking and Roadways	AF 4 (40) Primary Gates	Average to minimum levels shall not exceed 4:1
Access Control Zone	5 (50) in general area	Average to minimum levels shall not exceed 3:1
Search Areas	10 (100) or twice the immediate surrounding areas, whichever is greater at ID checking areas AF 20 (200) in ID checking areas under the canopy, and 30 (300) is required at the point of contact using additional task lighting	In immediate area where identification and inspection occur. Also vert. Illuminance = 25% of horizontal illuminance should be provided at the level of the vehicle driver. AF This level of lighting is only required for the Air Force
*Ground level is defined as 6 in (150 mm) above ground level		

UFC 4-022-01 25 May 2005

Some Example

Roberval
Quebec
Canada



Some Example



Some Example



References

- IESNA, ICAO, Civil Aviation Authority, TRB, SAE, technical paper
 - + 50 documents, 70% over web
- Additional reading (90% over web)
 - FAA, TRB, ...
 - Books
 - Technical paper
 - +10 documents

Conclusion

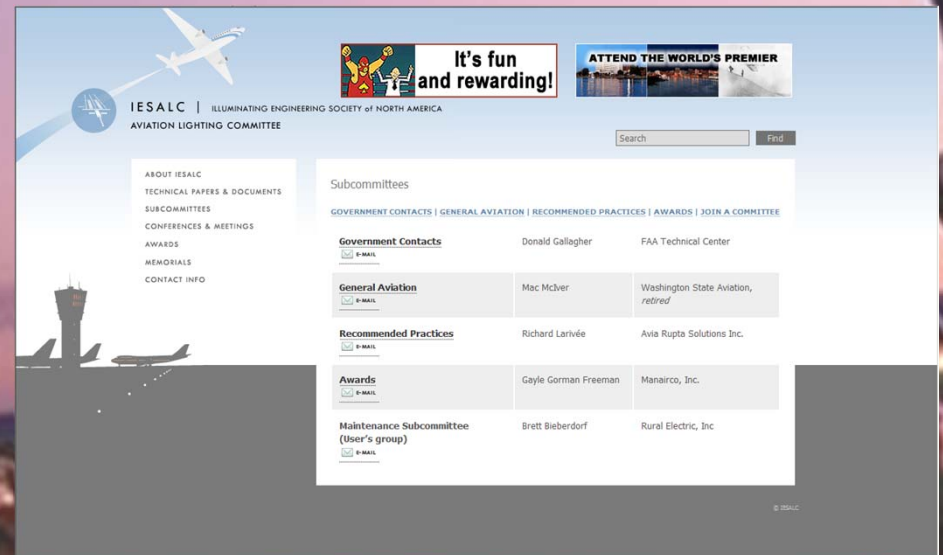
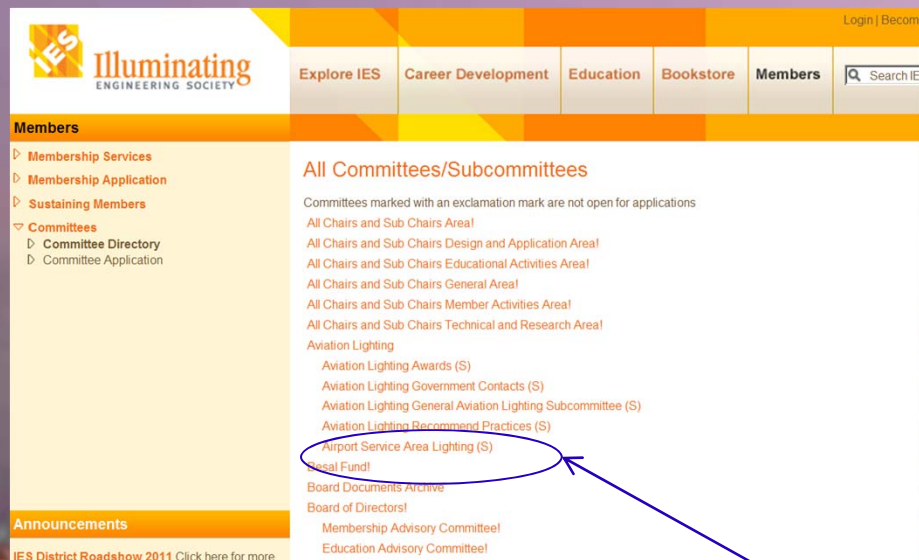
- Document – September 18, 2011
 - Intro, foreword, scope, committee list – 100%
 - End to end review – 30%
 - Pictures – 85%
 - Images & graphics – 50%
 - Glossary – 85%
 - References – 95%

Conclusion

- Harmonization is on-going
- Issues – GHS, pilots, tower control, OSHA coordination – light level and tasks lighting
- Discussions
 - NavCanada, CAC, Air Canada Pilot Association...
- Built upon experience
- Looking for airports to test concepts!

Conclusion

- IESALC board meeting
 - IESALC web site use for information about outdoor lighting
 - Proposal to change subcommittee name and define mission



Questions?

Richard Larivée, Chair IESNA RP-37

IESALC Recommended Practices Subcommittee

Web site: <http://www.iesalc.org/subcommittees>

E-mail: practices@iesalc.org