SOLIDWORKS Aerospace Setup & FAA reports

Tutorial Overview

In this tutorial you will evaluate a beam for compliance with the FAA Position and Anti Collision strobe lighting requirements.

Topics Covered

- Type A Coordinate System Setup for Aerospace
- photopia | reports FAA Compliance Reports
- Skill Level Intermediate
- Interface Photopia for SOLIDWORKS & photopia | reports

Estimated Completion Time - 20min





Type A Photometric Coordinate System Setup

- 1. Open SOLIDWORKS and open an Assembly document you would like to analyze.
- 2. Add the appropriate light source and assign appearances to the optical parts (see the *Setup an Analysis* tutorial for an overview of this process).
- 3. Insert an origin (Reference Point). This should be located at the center of the exit surface of your optical system.
 - a. Add a reference point by going to Insert > Reference Geometry > Point.
 - b. Select a point near the center of your lens. In the image below this is on the tip of the right wing.



- 4. Insert Reference Coordinate System.
 - a. Add a reference coordinate system by going to Insert > Reference Geometry > Coordinate System.
 - b. For the origin select the point you defined in Step 3.
 - c. The +Z axis should point towards the aft of the aircraft.
 - d. The +Y axis should point up with respect to gravity.
 - e. Click OK (✓) to add the coordinate system.



- 5. Setup Photometric Settings.
 - a. Select the new coordinate system defined in Step 4.
 - b. Select Photometric Settings in the Photopia CommandManager.
 - c. Change Photometry Type to Aerospace/Automotive.
 - d. Ensure the Photometric Type is Type A.
 - e. Set the Horizontal angles from -180 to 180 in 5 degree increments [-180(5)180].
 - f. Set the Vertical angles from -90 to 90 in 5 degree increments [-180(5)180].
 - g. As long as your Reference Coordinate System was oriented properly, your Photometric Coordinates should match the images below.
 - h. Click OK (✓) to save the Photometric Settings.



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- 6. Raytrace settings.
 - a. Click on the Photopia CommandManager, select Raytrace Settings.
 - b. Keep the default of 2.5 million rays and 25 ray reactions.
 - c. Click OK (\checkmark) to save the raytrace settings.
- 7. Save the assembly.
- 8. Run the raytrace
- 9. Click on the Photopia CommandManager and then select "Results".

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Check results against FAA requirements with photopia | reports

- 1. First export your IES file from Solidworks by choosing Results > IES File and then clicking the IES file to disk. IES file to disk.
- 2. Open **photopia** | **reports** on your computer, or right click on the exported IES file and choose Open to open in **photopia** | **reports**.
- 3. Choose "IES report" from the left hand menu.
- 4. Choose any of the FAA Compliance Reports from the thumbnails.



5. Within this report, you'll find an intensity false color plot which shows the intensity in candela, in the same orientation as your coordinate system, where 0,0 is dead ahead. The image below is for a red nav light.



This report is NOT an indicator of product approval from FAA or SAE, but a tool to test a product against some of the requirements.

Report Format ©2019 LTI Optics, LLC Report Type: FAA 18 PL-I P-2

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6. The second page contains a reduced intensity table showing the % of target value at each location. Shaded boxes are regions with a minimum candela requirement. Colored text are regions with a maximum candela requirement (cutoff).



Report generated with: photopia | reports www.ltioptics.com

Manufacturer: Luminaire Catalog Number: Luminaire Description: 747-AeroTest Test Lab: Photopia Beta for SOLIDWORKS 2019.0.1.9538 see: www.ltioptics.com/ies Test Number:

FAA TSO-C30c Report

SAE AS8037: Aircraft Position Lights

Position Type I (forward, red, left)

Test Date: Wednesday, March 13, 2019 4:13:01 PM

Intensity Pass/Fail

20 of 3285 test points did not meet minimum required candela. 521 of 6716 test points exceeded maximum allowed candela

Values below are % of required value. Shaded boxes are regions where a minimum candela is required. Colored text are regions where a maximum candela is allowed. Red is failing, green is passing.

	-180	-170	-160	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
90	100	100	100	100	100	20	n/a	400	400	400	400	400	400	400	400	400	67	50	50	n/a	10	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
80	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	333	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	20	n/a	200	200	200	200	200	200	200	200	200	300	275	275	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	100	100	100	100	100	80	n/a	267	267	267	267	267	267	267	267	267	278	283	283	n/a	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
20	100	100	100	100	100	140	n/a	280	280	280	280	280	280	280	280	280	280	280	280	n/a	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
10	200	200	200	200	200	220	n/a	275	275	300	275	275	275	275	275	275	283	281	281	n/a	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0
0	300	300	300	300	300	280	n/a	280	280	280	280	280	280	280	280	280	280	280	283	n/a	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300	0
-10	200	200	200	200	200	240	n/a	275	275	300	275	275	275	275	275	275	279	281	281	n/a	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	0
-20	100	100	100	100	100	140	n/a	280	280	280	280	280	280	280	280	280	280	280	280	n/a	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
-30	100	100	100	100	100	80	n/a	267	267	267	267	267	267	267	267	267	278	283	283	n/a	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
-40	0	0	0	0	0	20	n/a	200	200	200	200	200	200	200	200	200	267	275	275	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	20	n/a	400	400	400	400	100	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	20	n/a	400	400	400	400	400	400	400	400	400	267	300	300	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00	0	0	0	0	0	20	0/2	400	400	400	400	400	400	400	400	400	207	200	200	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-00	100	100	100	100	100	20	n/a	400	400	400	400	400	400	400	400	400	67	50	50	n/a	10	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Complete

Congratulations! You have completed the SOLIDWORKS Aerospace Setup & FAA Reports tutorial.

For more information and tutorials please visit our website at www.ltioptics.com. If you have any questions don't hesitate to reach out to our support team at photopia@ltioptics.com.