

D4.4: FEEDBACK REPORT ON BLINDING ANNOYANCE

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List of Abbreviations

ADP	Aéroports de Paris
ATCO	Air Traffic Control Officer
CAA	Civil Aviation Authority
CDG	Paris-Charles de Gaulle
DGAC	Direction Générale de l'Aviation Civile (French CAA)
eGPU	Electrical Ground Power Unit
PBB	Passenger Boarding Bridge
STAC	Service Technique de l'Aviation Civile
TIN	Technical Information Note
WP	Work Package
Wp	Watt-peak



1 Executive summary

1.1 Introduction

This report is part of the activities of Work Package 4 (terminal area) of the OLGA project coordinated by ADP. It is included in the task 4.1 (energy efficiency to achieve green construction) and specifically named sub-task 4.1.4 (solar installation on passenger bridge). The activity is developed in partnership with the STAC and with ITW GSE (e-GPU manufacturer). The experiment consists of installing solar panels on a telescopic Passenger Boarding Bridge (PBB) to charge eGPU batteries which can then partially power an aircraft during a stopover with a 400 Hz signal. This installation will reduce carbon footprint of air transportation during the aircraft stopovers.



Figure 1: Advantages of ITW GSE 7400 eGPU

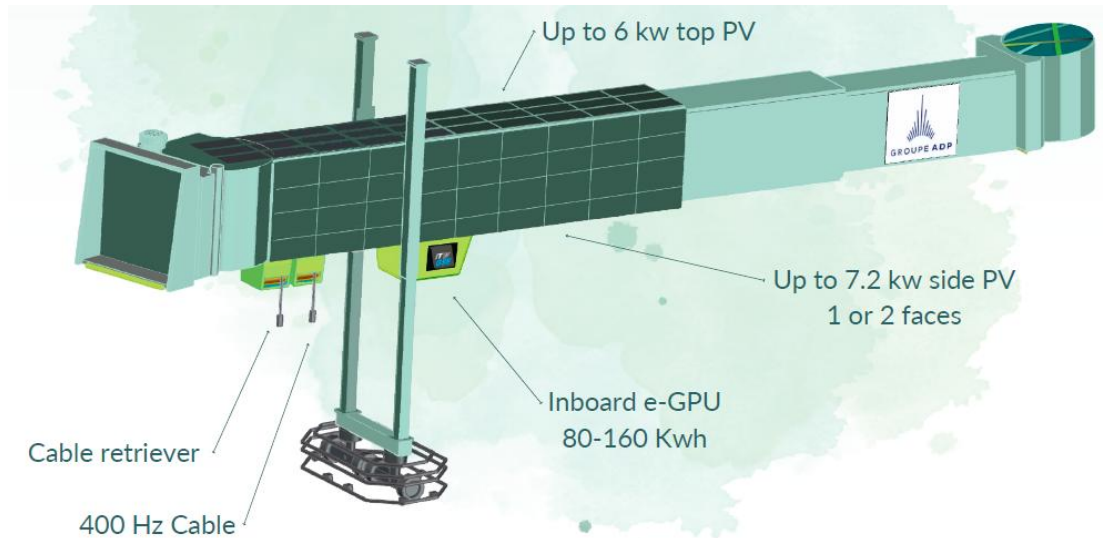


Figure 2: Solar installation on PBB overview

It is necessary to choose the appropriate PBB location as well as the appropriate solar panels model. Moreover, this activity has to deal with the glare aspects of solar panels on the Air Traffic Control Officers (ATCO) and the pilots.

1.2 Brief description of the work performed and the results achieved

The work performed so far concerns the following actions:

- a) Selection of the PBB location.
- b) Choice of the solar panels model.
- c) Dealing with the glare aspects of solar panels on the pilots and the ATCOs.

2 Task activities

2.1 Selection of the implementation site

In order to obtain the most representative solar exposure, the PBB n°U13.2 located at Terminal 1 of Roissy-Charles de Gaulle (CDG) airport was chosen for the experiment and was equipped with solar panels on its roof and on its right side (inside the PBB).



Figure 3: Location of the PBB n°U13.2



2.2 Selection of the solar panels model

In order to reduce glare for ATCOs and pilots and still have a good efficiency, special solar panels from Systovi were chosen. They offer a lower luminance level compared to other manufacturers' equipment (see table below). Their reference is V-SYS PRO Basse Luminance 330 WC. They develop a power of 330 Watt-peaks (Wp) with a surface efficiency rate of 19.5% for a unit area of 1.66 m² and have a low luminance (9200 cd/m²).

	Wp/m ²	Cd/m ²	Linear power warranty
Manufacturer n°1	210	not available (> 10 000)	87,2% after 15 years
Manufacturer n°2	200	not available (> 10 000)	83,5% after 30 years
Manufacturer n°3	197	not available (> 10 000)	80,2% after 25 years
Manufacturer n°4	216	not available (> 10 000)	90,3% after 15 years
Systovi	198	9200	80% after 25 years
Manufacturer n°5	203	< 12 000	87% after 25 years

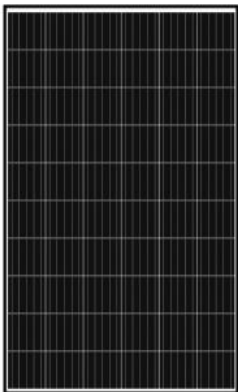
Table 1: Comparison of luminance levels of different solar panels





V-SYS PRO 330 WC

-> Basse luminance

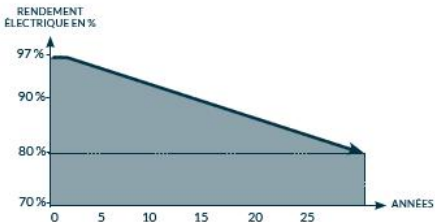


SYSTOVI
LE SEUL FABRICANT FRANÇAIS
DE SOLUTIONS SOLAIRES
POUR LE RÉSIDENTIEL

Choisir SYSTOVI, c'est choisir des solutions solaires conçues et fabriquées en France à Carquefou près de Nantes (44).

RECYCLABLE À 94,7 %.
Systovi recycle ses panneaux en partenariat avec l'éco-organisme 

-  **ESTHÉTIQUE PREMIUM**
Design fond blanc
Interconnexions cachées
Installation portrait et paysage
-  **PERFORMANCES OPTIMISÉES**
Verre solaire 9 200 cd/m² offrant une faible réflexion / un faible éblouissement
Adapté pour une pose proche d'un aéroport
Cellules monocristallines hautes performances PERC
-  **QUALITÉ ET SÉCURITÉ**
Usine certifiée ISO 9001 : 2015 et ISO 14001 : 2015
Certification IEC 61215 et 61730
Maîtrise du cycle de vie de nos produits
-  **GARANTIES**
Fabrication française
Garantie de fabrication de 20 ans
Garantie de rendement linéaire de 80 % à 25 ans :



RENDEMENT ELECTRIQUE EN %

97%
90%
80%
70%

0 5 10 15 20 25 ANNÉES





Figure 4: Datasheet of V-SYS PRO Basse Luminance 330 WC



2.3 Installation plan of the solar panels on the PBB

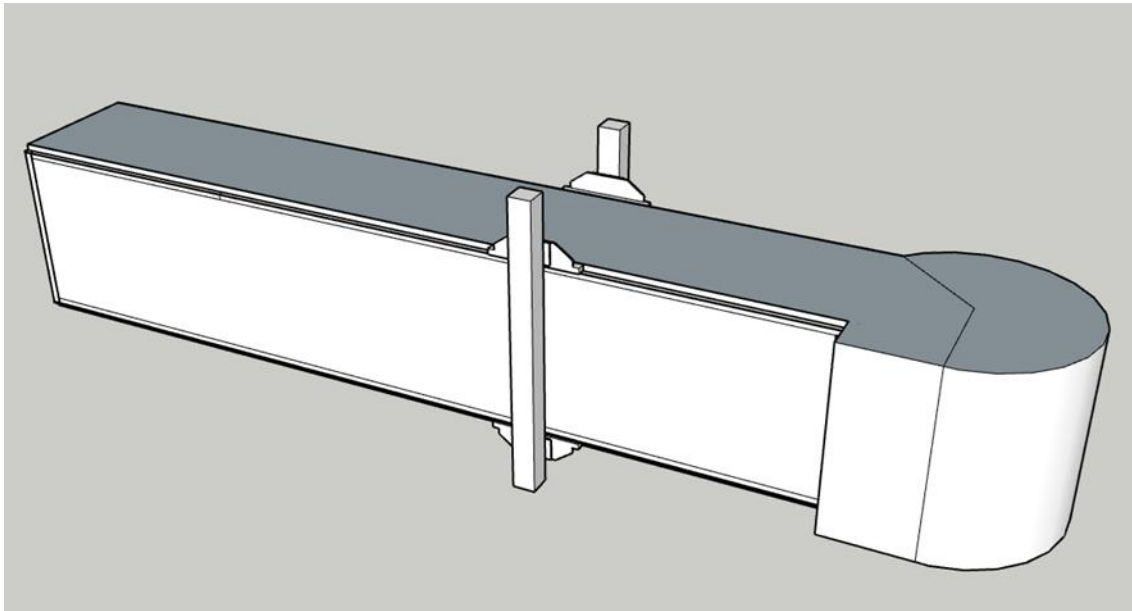


Figure 5: Overview of a PBB

On the roof of the PBB, 17 solar panels with a power of 5,61 Wp are installed, which represents a solar panel surface of around 29 m².



Figure 6: Example of a PBB roof

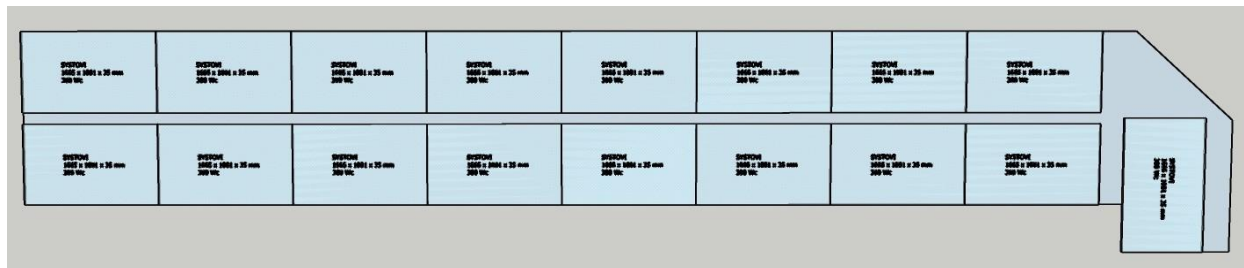


Figure 7: Installation of solar panels on a PBB roof

On the right side of the PBB, 20 solar panels with a power of 6,6 Wp are installed, which represents a solar panel surface of around 34 m².

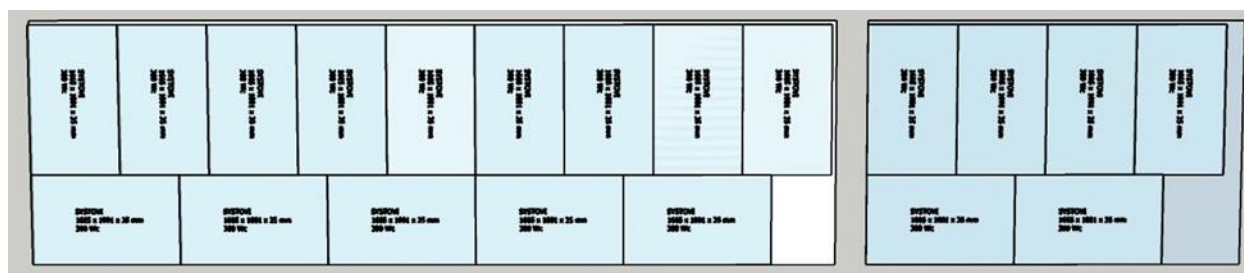


Figure 8: Installation of solar panels on the right side of a PBB

In total, 37 solar panels with a power of 12,210 Wp are installed, which represents a solar panel surface of about 63 m².

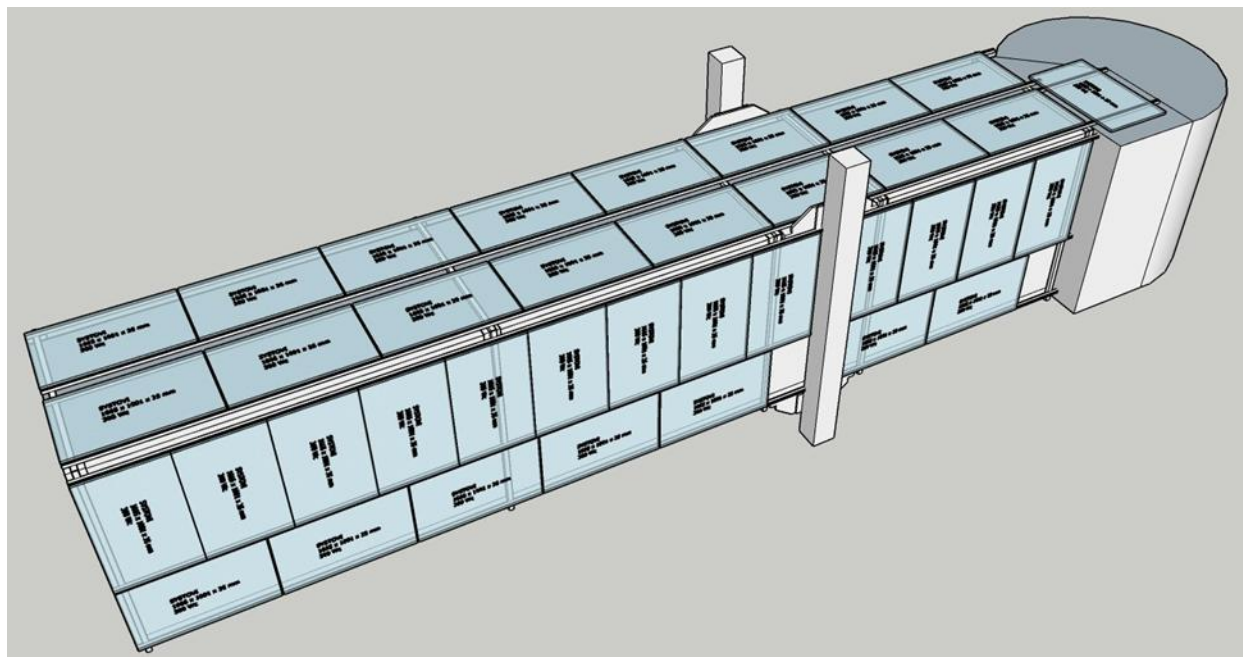


Figure 9: Overview of solar panels installation on the 2 faces of a PBB

2.4 Glaring aspects

In France, the installation of solar panels in the vicinity of an aerodrome should comply with the recommendations of the French CAA Technical Information Note (TIN), 5th edition, November, 10th, 2022 (containing provisions related to the installation of photovoltaic panels near aerodromes).

2.4.1 Pilots glare

As the solar panels:

- represent a surface area of approximately 63 m², which is well below 500 m²,
- and are located outside the zones mentioned in article 4.3.4.3.1 of the French CAA TIN,

pilots glare is not considered as an issue to be dealt with.

2.4.2 ATCOs glaring

The PBB n° U13.2 is located at a distance of approximately 220 m from the Northern air traffic control tower.

Considering the following points:



- the layout of the photovoltaic panels, which are distributed approximately half on the roof of the PBB and half on the right side of the PBB,
- the total surface area of the panels is less than 100 m², and
- the luminance of the panels is low i.e. less than 10 000 cd/m²,

the experiment led by ADP should not normally cause incapacitating glare to ATCOs. If this were the case, the necessary corrective actions should be taken by ADP.

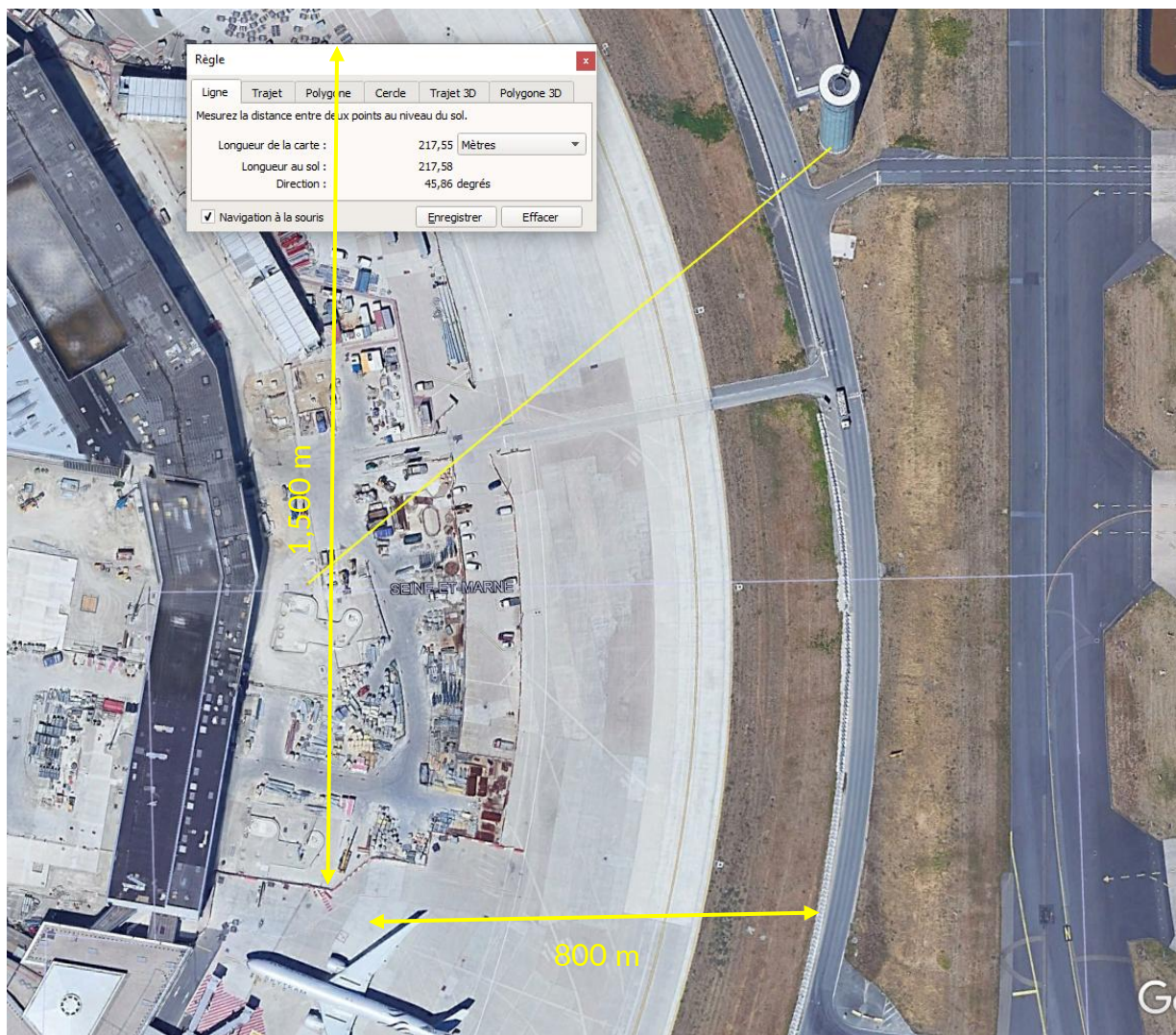


Figure 10: Distance of the nearest ATC Tower from the PBB

Dissemination level: public.

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2.4.3 Addendum – feedback from pilots or ATC

To address the concerns regarding the need for feedback from pilots or air traffic controllers on the induced effects of glare, additional investigations were conducted.

First, it should be recalled that the risk of visual disturbance for pilots and air traffic controllers was considered negligible or even non-existent, given:

- the panel surface area,
- the positioning of the panels outside zones likely to pose a risk of glare for pilots,
- the distance from the control tower.

The additional investigations consisted of querying the ECCAIRS database to identify whether any incidents reporting glare issues at Paris-CDG Airport were reported between 01/01/2024 and 15/10/2025 by pilots or air traffic controllers.

Since the panels were installed in February 2025, the results of the database extraction could reveal a difference before and after the installation of said panels and thus potentially adjust the initial conclusion of this report.

The data extraction, carried out by the French supervisory authority (DSAC), covered a broader time period (2018 to October 2025) and shows that:

- 10 events reported glare issues encountered by pilots at Paris-CDG between 2018 and 2025.
- All 10 events were due to glare caused by lasers.
- For the period of interest (01/01/2024 – 15/10/2025), only 3 events were identified: one in 2024 and two in summer 2025. None were related to photovoltaic panels.

Therefore, the initial conclusion of this report remains unchanged and does not need to be modified or qualified.



3 Conclusion and outlook

This first experiment can be conducted on a small scale, on only one PBB for the moment.

For the upcoming years, the feedback from this trial should be taken into account in order to implement the concept on a larger scale.

Moreover, the recommendations contained in the DGAC TIN regarding the installation of solar panels near aerodromes will certainly be relaxed to allow the implementation of such experiments on a larger scale.

4 References

Technical Information Note (TIN), 5th edition, November, 10th, 2022 containing provisions related to the installation of photovoltaic panels near aerodromes.

<https://www.stac.aviation-civile.gouv.fr/fr/securite-aerodromes/projet-dimplantation-panneaux-photovoltaiques/presentation-nit-sur-linstallation-panneaux-photovoltaiques-pres-aerodromes>