

**PARIS MADRID 2011
GREEN AVIATION CHALLENGE
TECHNICAL RULES**

1- Generality

The general grading will be made from the sum of the score of each leg for the main and second grading. All the leg will have the same weighting.

The team having the best score in the general grading (main grading) of its category will be the winner of the PARIS-MADRID 2011.

However the ORGANISERS will reward the fastest aircraft, the most ecological aircraft and the aircraft with the heaviest payload all along the challenge. This is not described in this document.

2- Criteria

- Speed in km/h
- Payload in kg
- Distance in flight en km
- Fuel consumption in l
- Nose level in dBA

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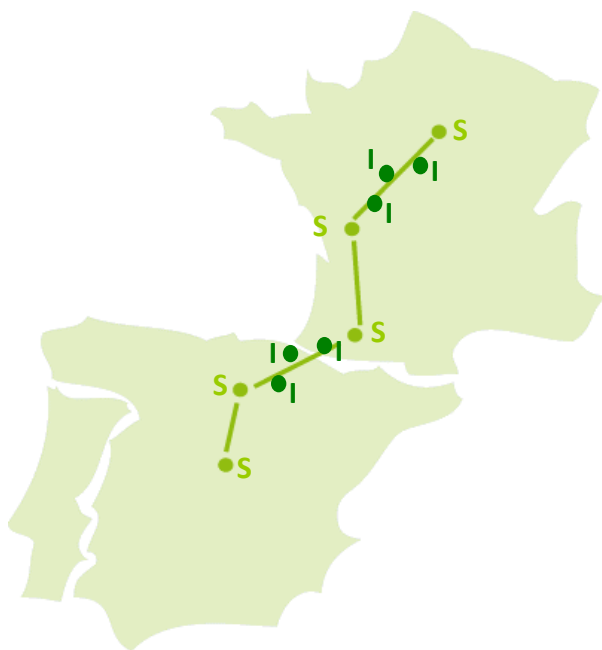
3- Main grading – Category I

▪ Challenge flight legs :

Ferté-Alais-Cognac=	410km max	17 june
Cognac-Tarbes=	279km max	18 june
Tarbes	Nose level test	19 june
Tarbes-Burgos=	325km max	20 june
Burgos-Ocana=	215km max	21 june
Tot=	1229km max	

All those airfield are define as Step (noted S on the map here-after). Those distances are approximate. All the legs must be realized to be in the general grading (except in case of leg cancellation).

For each flight leg, intermediary airfields (noted I on the map here-after) will be defined so the participants will be able to land due to range, weather , etc. The result of the distance will be the distance performed in flight between the departure airfield (S) and this intermediary airfield (I).



- **Criteria for grading :** speed (in km/h), payload (in kg), distance (in km), nose level (in dBA)

▪ Bonus

If the TEAM reach the final leg airfield in the same day, a bonus of x points will be gained.

▪ Malus

If the TEAM stops out of an intermediary airfield, it will be penalized of x points.

▪ Score :

Let S_1 the highest speed, S_x the speed of the TEAM X and SS_x the score related to the speed of the TEAM X :

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$$SS_X = S_X / S_1 * 1000 \text{ in points}$$

Let P_1 the highest payload, P_X the payload of the TEAM X and SP_X the score related to the payload of the TEAM X :

$$SP_X = P_X / P_1 * 1000 \text{ in points}$$

Let D_1 the highest distance, D_X the distance of the TEAM X and SD_X the score related to the distance of the TEAM X :

$$SD_X = D_1 / D_X * 1000 \text{ (in points)}$$

Let N_1 the lowest nose level, N_X the nose level of the TEAM X and SN_X the score related to the nose of the TEAM X :

$$SN_X = N_1 / N_X * 1000 \text{ (in points)}$$

Let S_X , the total score of the team X for one leg :

$$S_X = SS_X + SP_X + n \cdot SD_X + m \cdot N_X \text{ (in points)} + \text{Bonus}_X - \text{Malus}_X$$

n, m : weighting factors

4- Main grading – Catégorie II

▪ Challenge flight legs :

Ferté-Alais-Cognac=	410km max	17 june
Cognac-Tarbes=	279km max	18 june
Tarbes	Nose level test	19 june
Tarbes-Burgos=	325km max	20 june
Burgos-Ocana=	215km max	21 june
Tot=	1229km max	

Those distances are approximate. All the legs must be realized to be in the general grading (except in case of leg cancellation).

- **Criteria for grading** : speed (in km/h), payload (in kg), fuel consumption (in l), nose level (in dBA)
- **Malus**

If the TEAM stops out of the final airfield of the leg, it will be penalized of x points.

▪ Score :

Let S_1 the highest speed, S_X the speed of the TEAM X et SS_X the score related to the speed of the TEAM X :

$$SS_X = S_X / S_1 * 1000 \text{ in points}$$

Let P_1 the highest payload, P_X the payload of the TEAM X and SP_X the score related to the payload of the TEAM X :

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$$SP_X = P_X / P_1 * 1000 \text{ in points}$$

Let C_1 the lowest fuel consumption, C_X the fuel consumption of the TEAM X et SD_X the score related to the fuel consumption of the TEAM X :

$$SC_X = C_1 / C_X * 1000 \text{ (in points)}$$

Let N_1 the lowest nose level, N_X the nose level of the TEAM X and SN_X the score related to the nose of the TEAM X :

$$SN_X = N_1 / N_X * 1000 \text{ (in points)}$$

Let S_X , the total score of the team X for one leg :

$$S_X = SSX + SP_X + m SC_X + n N_X \text{ (in points) - Malus}_X$$

n, m : weighting factors

5- Second grading (Cat I et II)

- **Criteria** : speed (in km/h), payload (in kg), distance (in km) for category I, fuel consumption (in l) for category II
- **Score** : for each category and each criteria, the differences between the results measured and the results announced before the flight will be computed.

Let ΔS_1 the lowest speed differences and ΔS_X the differences between announced speed and the measured speed (average) of the participant X. $S\Delta S_X$ the score related to the speed difference of the participant X :

$$S\Delta S_X = 1 / (1 + (\Delta S_X - \Delta S_1)) * 1000 \text{ in points}$$

Let ΔP_1 the lowest payload differences and ΔP_X the differences between announced payload and the measured payload (average) of the participant X. $S\Delta P_X$ the score related to the payload difference of the participant X :

$$S\Delta P_X = 1 / (1 + (\Delta P_X - \Delta P_1)) * 1000 \text{ in points}$$

Category I: Let ΔD_1 the lowest distance differences and ΔD_X the differences between announced distance and the measured distance (sum) of the participant X. $S\Delta D_X$ the score related to the distance difference of the participant X :

$$S\Delta C_X = 1 / (1 + (\Delta C_X - \Delta C_1)) * 1000 \text{ in points}$$

Category II: Let ΔC_1 the lowest fuel consumption differences and ΔC_X the differences between announced fuel consumption and the measured fuel consumption (sum) of the participant X. $S\Delta C_X$ the score related to the fuel consumption difference of the participant X :

$$S\Delta C_X = 1 / (1 + (\Delta C_X - \Delta C_1)) * 1000 \text{ in points}$$

Let $S\Delta_X$, the total score of participant X:

$$S\Delta_X = S\Delta S_X + S\Delta P_X + S\Delta D_X / S\Delta C_X$$