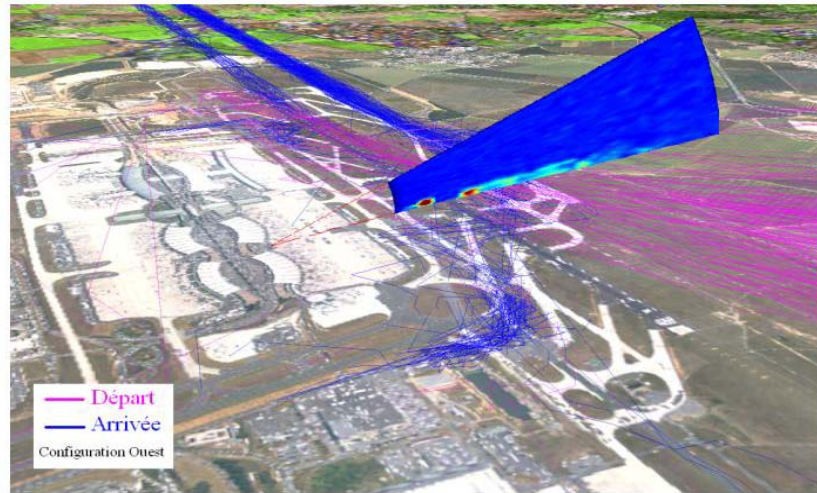


# WakeNet3-Europe

1<sup>st</sup> Workshop

## Wake Turbulence Safety in Future Aircraft Operations

*Final Announcement &  
Programme*



Paris-Versailles

8<sup>th</sup> & 9<sup>th</sup> of January 2008

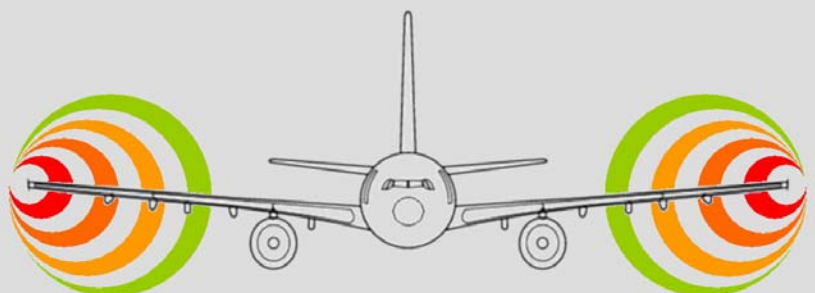
67 Rue Charles De Gaulle

Jouy-En-Josas, Yvelines 78350, France



Hosted by  
**THALES**

Coordinated by  
**AIRBUS**



**WakeNet3-Europe**  
A network on Aircraft Wake Turbulence



## 1<sup>st</sup> Workshop

# Wake Turbulence Safety in Future Aircraft Operations

## Topics

### ***Topic 1: Wake vortex concepts in SESAR and NextGen***

New air traffic management concepts are planned to be introduced in Europe via the European Air Traffic Management modernisation program (*SESAR*) and in the USA (*NextGen*). These shall enable the safe and efficient increase in air traffic in the future. The topic shall provide an overview of the *SESAR* and *NextGen* projects and specifically highlight those new procedures and concepts that are affected by wake turbulence separation requirements.

- How is wake turbulence safety addressed in *SESAR* and *NextGen*?
- What are the related projects? How are they harmonised and how can other activities be harmonized with *SESAR* and *NextGen*?
- Are there any concepts requiring additional consideration of wake vortex safety?
- Which advances in wake vortex technologies are required to fulfil the expectations of *SESAR* and *NextGen*?

### ***Topic 2: Operational detection and prediction of wake vortices***

Direct measurement as well as model-based prediction of wake vortices has significantly improved in the last decade. Research activities towards further improvements are ongoing with the aim to provide more reliable, more capable, and operational systems, on the ground and for airborne applications.

- What are the requirements on measurements and models for decision making and/or safety monitoring?
- What is the current quality of wake detection and characterisation by sensor?
- Which sensor capabilities are feasible and when could they become operational?
- Are new sensor technologies emerging?
- What is the current quality of model-based predictions? What are the required inputs and how is the quality affected by the availability / quality of the inputs?
- How can operational wake prediction models be validated?
- How can models and measurements be fused?

### ***Topic 3: Wake vortex related safety cases for operational implementation***

Any changes potentially affecting wake turbulence safety need to be thoroughly evaluated in dedicated safety cases. Examples of such changes are the introduction of RVSM, the introduction of new large aircraft (e.g. A380, B747-8), changes to approach wake turbulence separations (e.g. time based separation) as well as the introduction of additional safety nets (e.g. airborne alerting).

- In the absence of specific regulatory requirements and prescribed means of compliance, how can wake turbulence safety be evaluated?
- What is the role of safety monitoring and what are the latest experiences with incident reporting and analysis?
- Is the current situation sufficiently safe to serve as reference in relative safety assessments?
- How is the current level of safety defined? Is it possible to strictly distinguish between relative and absolute safety assessments?
- How has wake vortex safety been addressed in recent developments, what is planned in ongoing activities?

### ***Topic 4: Wake advisory & warning systems***

Wake sensors and model-based predictions allow for dedicated wake advisory and warning systems on the ground (especially at capacity-constrained airports) as well as in the air. Onboard and ground-based systems may operate independently or in collaboration. They may use sensors and/or models to assure safety. They may replace existing separation rules or act as additional safety nets.

- Which general concepts are feasible? What are their individual strengths and constraints?
- What could be the roles attributed to ground and airborne systems? How should they interact?
- How do advisory and warning systems relate to general recategorisation?

### ***Topic 5: Towards recategorisation of wake turbulence separations***

General recategorisation of wake turbulence separation is evaluated by ICAO, Eurocontrol and FAA. Concepts range from “simple” subdivision of existing weight categories to dynamic separations. The goal is to provide initial capacity gains in the short term and allow for more complex methods providing larger gains in the future.

- What are the current plans, options and constraints?
- What exactly could constitute dynamic separation?
- How shall the new separations be introduced? How would the corresponding safety cases be established? Would it require an absolute or relative safety assessment?
- How can it be assured that new separation schemes are fair?
- Which technical enablers are required?



## 1<sup>st</sup> Workshop

# Wake Turbulence Safety in Future Aircraft Operations

## Workshop Agenda

### Thursday, 08 January 2009 (1st day)

**08:30 Registration**

**09:00 Welcome & Introduction**

**09:30 Topic 1 : Wake Vortex Concepts in SESAR and NextGen**

Chair: Jean-Luc MARCHAND / EUROCONTROL

**09:30 SESAR Overall Framework and Concept**

Robert GRAHAM / EUROCONTROL

**10:00 Wake Vortex Topics in SESAR**

David BOOTH / EUROCONTROL, Andrew HARVEY / EUROCONTROL

**10:30 Wake Vortex in the Context of NextGen**

Steven LANG / FAA, Jeff TITTSWORTH / FAA

**11:00 Standardization Activities for Wake Vortex Data Link Services**

Laurence MUTUEL / Thales Avionics, Wayne BRYANT / FAA, Ernie DASH / FAA

**11:30 Break**

**12:00 Topic 2 : Operational Detection and Prediction of Wake Vortices**

Chair: Sebastian KAUERTZ / Airbus

**12:00 Some reflections on the achievable quality of operational wake vortex prediction using operational met and a/c inputs**

Gregoire WINCKELMANS / UCL

**12:25 On the maturity of wake vortex observation, prediction, and validation**

Frank HOLZÄPFEL / DLR

**12:50 Lunch**

**14:00 Initial estimation of flight tests regarding verification of on-board wake vortex prediction algorithms**

Andreij BELOTSEKOVSKY / CCAS Russian Academy of Science

**14:25 Near-field evolution of trailing vortices and initialization of far-field models**

Jeffrey CROUCH / Boeing

**14:50 Pulsed 1.5  $\mu$ m LIDAR for aircraft wake vortex detection and monitoring**

Agnes DOLFI-BOUTEYRE / ONERA

**15:15 Wake vortex X-band radar monitoring: Paris-CDG airport 2008 campaign results & perspectives**

Frederic BARBARESCO / Thales Air Systems

**15:40 Break**

**16:10 First approach to wake vortex prediction and detection integrated fusion filters**

Shanna SCHOENHALS / TU Braunschweig, Meiko STEEN / TU Braunschweig

**16:35 Wake vortex detection using Flight Data Recorder data registered on board aircraft**

Henk HAVERDINGS / NLR

**17:00 FAR-Wake: Fundamental Research on Aircraft Wake Phenomena**

Thomas LEWEKE / IRPHE CNRS

**17:25 End of Day 1**





## 1<sup>st</sup> Workshop

# Wake Turbulence Safety in Future Aircraft Operations

## Workshop Agenda

### Friday, 09 January 2009 (2nd day)

08:00	<b>Opening</b>
08:30	<b>Wrap-up of first day</b>
08:45	<b>Topic 3 : Wake Vortex related Safety Cases for Operational Implementation</b> Chair: Tim FOWLER / Det Norske Veritas
08:45	<b>Worst-case analysis of wake vortex risk of 700ft vertical separation</b> Gerben VAN BAREN / NLR
09:10	<b>Wake vortex severity assessment - a core element of the safety case</b> Carsten SCHWARZ / DLR, Frank HOLZÄPFEL / DLR, Thomas GERZ / DLR, Klaus-Uwe HAHN / DLR
09:35	<b>Development of the Safety Case for the CREDOS operation</b> Lennaert SPEIJKER / NLR
10:00	<b>Break</b>
10:30	<b>Airbus wake vortex flight test campaigns and general conclusions</b> Claude LELAIE / Airbus, Andreas REINKE / Airbus
10:55	<b>National Rule Change and Follow-on</b> Steven LANG / FAA, Jeff TITTSWORTH / FAA
11:20	<b>Wake turbulence safety assessment of the arrival and departure segregated operation in Paris CDG</b> Vincent TREVE / EUROCONTROL
11:45	<b>Developing Local Wake Turbulence Separation Standards (Never Ending Story)</b> Isa ALKALAY / Skyguide
12:10	<b>Lunch</b>
13:20	<b>Topic 4 : Wake Advisory &amp; Warning Systems</b> Chair: Peter ERIKSEN / EUROCONTROL
13:20	<b>ATC-Wake: Integrated ATC Wake Vortex Safety and Capacity System</b> Lennaert SPEIJKER / NLR
13:45	<b>Wake Vortex Advisory System</b> Jean-Francois MONEUSE / Thales Air Systems
14:10	<b>Technologies and procedures for wake vortex flight safety in the Russian next-generation air navigation system</b> Eduard FALKOV / GosNII AS
14:35	<b>Break</b>
15:00	<b>Topic 5 : Towards Recategorisation of Wake Turbulence Separations</b> Chair: Prof. Robert LUCKNER / Technische Universität Berlin
15:00	<b>Model-based recategorisation - options and challenges</b> Andreas REINKE / Airbus
15:30	<b>RECAT Phase 1: Towards the Identification of new Static Wake Turbulence Categories along with their Associated Wake Turbulence Separation minima</b> Elsa FREVILLE / EUROCONTROL, Steven LANG / FAA, Jeffrey TITTSWORTH / FAA
16:00	<b>Workshop Wrap-up</b> Andreas REINKE / Airbus, Jean-Luc MARCHAND / EUROCONTROL, Sebastian KAUERTZ / Airbus, Tim FOWLER / Det Norske Veritas, Peter ERIKSEN / EUROCONTROL, Prof. Robert LUCKNER / Technische Universität Berlin and Bram ELSENAAR
16:30	<b>End of Workshop</b>

# WakeNet3-Europe



## 1<sup>st</sup> Workshop

# Wake Turbulence Safety in Future Aircraft Operations

### *Who should attend*

The workshop is directed at everyone professionally involved in wake vortex related aerospace activities, including scientists, researchers, members from aviation authorities, air navigation service providers, airport operators, airlines, pilots, aircraft and system manufacturers etc. The workshop shall provide the opportunity to strengthen the relations between all interested stakeholders in order to facilitate future activities towards achieving the ACARE „Vision 2020“ while taking into account wake turbulence safety.

### *Exhibitions*

The workshop also proposes an exhibition space at THALES University: this opportunity to showcase your products and know-how is exceptional. If you wish to apply as an exhibitor to the WakeNet3-Europe workshop, please contact M. Frederic Barbaresco, email: [frederic.barbaresco@thalesgroup.com](mailto:frederic.barbaresco@thalesgroup.com), phone: +33 (0)1 64 91 99 24.

### *Practical information*

The workshop is scheduled to open Thursday, January 8<sup>th</sup>, 2009, at 8:30 with presentations commencing at 9:00 and to last until Friday, January 9<sup>th</sup>, 2009, at 16:30.

Thales University in Jouy En Josas is situated in the south-west of Paris, in the vicinity of Versailles.

Practical information (travel tips, list of hotels) is available on the WakeNet3-Europe website under [www.wakenet.eu](http://www.wakenet.eu).

The local organisation committee consists of: F. Barbaresco (Thales Air Systems) and L. Mutuel (Thales Avionics)

### *Fees*

A modest workshop fee of €50,- will be asked of each participant. This fee includes the workshop proceedings as well as catering during both days. Prospective participants from Eastern European Countries may contact the coordinator for financial assistance. PhD students can exempt from the workshop fee - please contact the coordinator.

### *Registration*

All participants are required to register their attendance in advance of the workshop and no later than January 2nd, 2009. For registration please use the registration page available on the internet under [www.wakenet.eu/workshop/register.php](http://www.wakenet.eu/workshop/register.php).

### *Social event*

The social event will take place in the Versailles Castle and Royal staples area in the evening of January 8th, 2009.

A room will be privatized for us and fine cuisine catering will be available. We propose an introduction to the French Equestrian know-how of the Equestrian Academia in the Royal Stable in Versailles just across from the Palace. Hostesses will welcome you and show you to le manège where horses are trained.

The private show is known as la leçon and is orchestrated by the cavaliers themselves: they will demonstrate with the various brands of horses within the stable the details of their work, the finesse and lightness of their touch and the natural elegance of the horses. The lesson will end with a choreographed excerpt from the world-renowned equestrian show by Bartabas. Following the show will be a visit of the historical royal staple. Finally a cocktail dinner will be served in the Oliviera dinner room showing a unique view of the illuminated Versailles Palace.

A bus will take you from THALES University to the venue and back. You can meet the group at the Stable or use the bus service setup for the event and included in the price of the social event. In order to join and to cater for the cost of this excellent event you are expected to indicate so during registration and pay an additional €100,- (please select "Workshop and Social Event").

Spouses and professionals that are unable to attend the workshop are also welcome to join the social event: please register each participant individually and select "Social Event Only".



# WakeNet3-Europe

## 1<sup>st</sup> Workshop

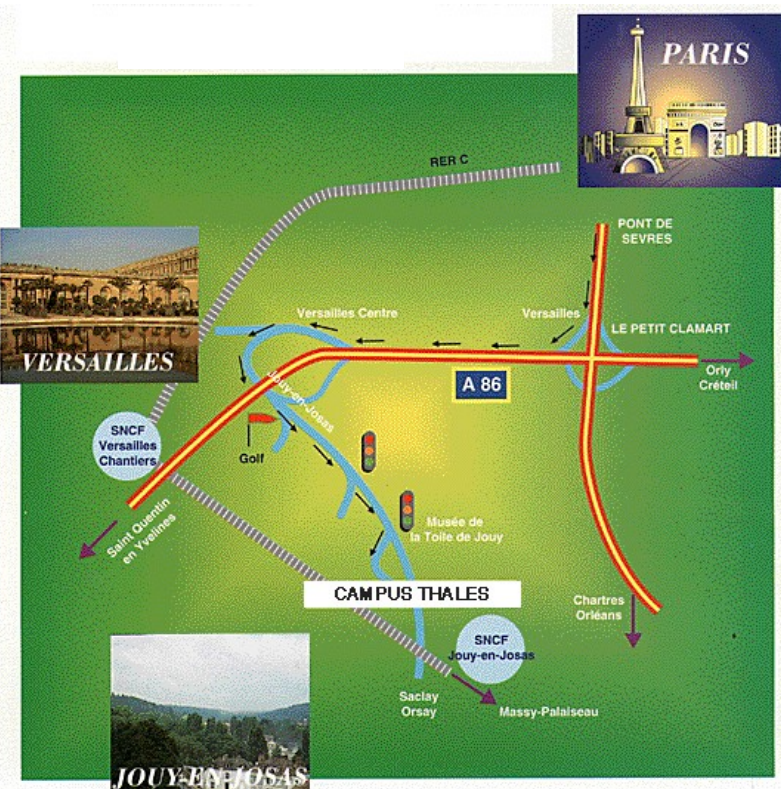
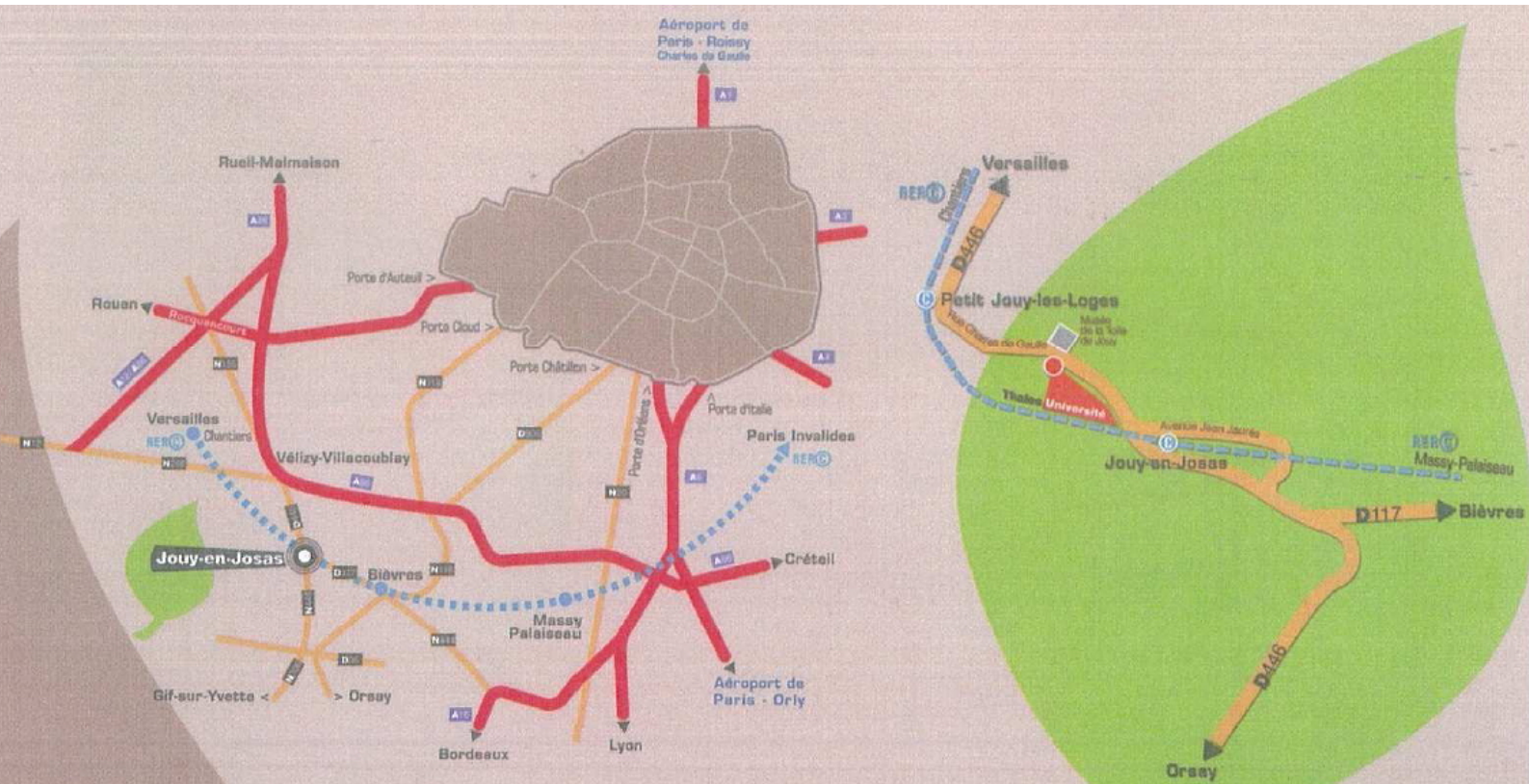
### Wake Turbulence Safety in Future Aircraft Operations

#### Getting there

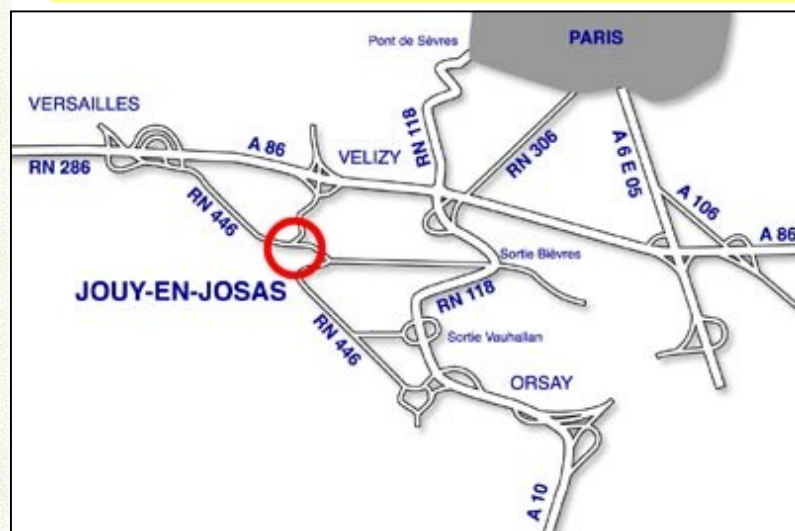
**By train:** THALES University is 10 minutes walking distance from the train station *JOUY-en-JOSAS*. The station is situated on the SNCF line connecting *Massy-Palaiseau* and *Versailles Chantiers* (trains every 30 minutes). You reach *Versailles Chantiers* from *Paris Gare de la Montparnasse* (20 minutes journey time) or *Massy-Palaiseau* using the RER-line trains C or B.

**By car:** From Paris, leave the ring at exit *Boulogne - Porte de St Cloud*. At *Pont de Sèvres* take direction *Chartres-Orléans*, then direction *Versailles* (A86). Exit at *Versailles-centre, Jouy-en-Josas*.

**By plane:** From Orly airport the taxi ride will take about 30 minutes. From Roissy / CDG the taxi ride will take about 1 hour.



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[hotesses.tu@thalesgroup.com](mailto:hotesses.tu@thalesgroup.com)







## 1<sup>st</sup> Workshop

# Wake Turbulence Safety in Future Aircraft Operations

## Accommodation

Below is a list of hotels in the vicinity of the Thales University.

Quoted room charges are approximate and provided here for reference only. Please contact the hotels directly and in time to assure reservation.

Name	Cat	Price	Telephone	Fax	Address	City
Thales Seminar Center	**	€ 90	01.30.84.64.00	01.30.84.64.63	67 Rue Charles De Gaulle	JOUY EN JOSAS
Hôtel IBIS la Cour Roland	**	€ 86	01.39.46.55.44	01.34.65.34.61	Domaine de la cour Roland	JOUY EN JOSAS
Hôtel HOLIDAY INN	***	€ 104	01.69.35.43.21	01.69.35.43.22	1 rue de la Libération	JOUY EN JOSAS
Hôtel Le Relais de Courlande	***	€ 110	01.30.83.84.00	01.39.56.06.72	23 rue Division Leclerc	JOUY EN JOSAS
CRC	**	€ 75	01.39.56.25.75	01.39.56.42.62	5 rue de la Libération	JOUY EN JOSAS
Hôtel CAMPANILE	**	€ 75	01.39.56.26.26	01.39.56.26.27	rue Clément Ader	BUC
Hôtel AMARYS	**	€ 80	01.39.56.48.11	01.39.56.81.54	Avenue Morane Saulnier	BUC
Hôtel NOVOTEL	***	€ 100	01.69.35.66.00	01.69.41.01.77	rue Charles Thomassin	SACLAY
Hôtel IBIS	**	€ 95	01.39.53.03.30	01.39.50.06.31	4 av. du Gal de Gaulle	VERSAILLES
Relais Mercure Versailles	***	€ 110	01.39.50.44.10	01.39.50.65.11	19 rue Philippe de Dangeau	VERSAILLES
Hôtel de France	***	€ 130	01.30.83.92.23	01.30.83.92.24	5 rue Colbert	VERSAILLES
Hôtel Le Paris	**	€ 85	01.39.50.56.00	01.39.50.21.83	14 Avenue de Paris	VERSAILLES
Hôtel la Résidence du BERRY	***	€ 127	01.39.49.07.07	01.39.50.59.40	14 rue d'Anjou	VERSAILLES
Hôtel SOFITEL	****	€ 145	01.39.07.46.46	01.39.07.46.47	2 bis Avenue de Paris	VERSAILLES
Suithôtel	***		01,40,83,75,15	01,40,83,75,16	1 rue du petit clamart	VELIZY
Holiday inn	***		01,39,46,96,98	01.39.46.94.16	22 Av de l'europe	VELIZY
Hôtel IBIS PARLY 2	**	€ 103	01.39.63.37.93	01.39.55.18.66	44 Avenue du Tartre	LE CHESNAY
Hôtel Mercure	***	€ 132	01.39.55.11.41	01.39.55.06.22	2 rue Marly le Roi	LE CHESNAY
Hôtel Novotel château de Versailles	***	€ 130	01.39.54.96.96	01.39.54.94.40	4 boulevard St Antoine	LE CHESNAY
Novotel			01.64.53.90.00	01,64,47,17,80		MASSY
Mercure			01.69.32.80.20			MASSY
Novotel Saint Quentin Golf National	***	€ 130	01.30.57.65.65	01.30.57.65.00	1 Avenue du Golf	MAGNY LES HAMEAUX
Mercure	***	€ 125	01.39.30.18.00	01.30.57.15.22	Place choiseul avenue du centre	st quentin
Hôtel Mercure Maurepas	***	€ 110	01.30.51.57.27	01.30.66.70.14	1 rocade de camargue	MAUREPAS