UPC - Castelldefels, Barcelona (Catalonia)

ICRAT '18

International Conference
on Research
in Air Transportation

Monday, June 25

12:15 PM	**ICRAT 2018 registration is open!**
12:30 - 6:00 PM	datAcron DART *Classroom 028-1*
	Data-Enhanced Trajectory Based Operations Workshop

Hola! **ICRAT welcome reception (6:45 pm at the entrance)**

Welcome remarks
Marc Bourgois (Eurocontrol)
Xavier Prats (Universitat Politècnica de Catalunya)

Welcome to Barcelona!

#ICRAT18

Sign-in and Breakfast (8:15 - 9:15 am)

Auditorium 001

9:15 AM — **Introduction to the conference:**
- **Eric Neiderman** — U.S. Federal Aviation Administration
- **Marc Bourgois** — Eurocontrol
- **Xavier Prats** — Universitat Politècnica de Catalunya (UPC)

9:25 AM — **Welcome address:**
- **Luis Alonso** — Director of the Castelldefels School of Telecommunications and Aerospace Engineering - UPC
- **Francesc Torres** — Rector of the Universitat Politècnica de Catalunya

Tutorial sessions (9:45 - 10:45 am)

Classroom 024G

9:45 AM — Kurtulus Izzetoglu

Use of Neurophysiological Measures to Assess Cognitive Performance of UAS Operators

Classroom 025V

9:45 AM — Fedja Netjasov

Safety hazard identification approach for future highly automated ATM concept of operation: experiences from AUTOPACE project

Coffee / Tea break (10:45 - 11:15 pm)

Paper sessions (11:15 am - 1:15 pm)

Classroom 024G	Classroom 025V	Classroom 026V
Track 1: Human Performance	**Track 2: System Performance**	**Track 3: Fuel and Emissions**
Session Chair: Sameer Alam	*Session Chair: Mark Hansen*	*Session Chair: Hartmut Fricke*
#36 11:15 AM — Eva María Puntero Parla, Patricia Lopez de Frutos, Elena Lopez Ballestin, Jose Cañas, Pedro Ferreira, Victor Fernando Gómez and Francesca Lucchi **Quantitative Prediction of Automation Effects on ATCo Human Performance**	**#38** 11:15 AM — Max Li and Megan Ryerson **Novel Terminal Arrival Airspace Robustness Metrics via Topological Density Clustering**	**#04** 11:15 AM — Fei Liu, Nanjian Zhuang, Qiang Ren and Zhiqiang Wei **Estimation of Aircraft Fuel Consumption Based on Air Traffic 4D Trajectory Data**
#87 11:55 AM — Somil Shah and Angela Campbell **Analyzing Pilot Decision-Making Using Predictive Modeling**	**#42** 11:55 AM — Wei Dai, Rainer Koelle, Lingling Ma and Yifei Zhao **Comparing Scheduled Block Time Setting in Europe and China based on Multiple Linear Regression**	**#27** 11:55 AM — Ramon Dalmau, Alex Ramonjoan, Xavier Prats and Santiago Soley **Estimating Fuel Consumption from Radar Tracks: A Validation Exercise using FDR Data from Descent Trajectories**
#102 12:35 PM — Duc-Thinh Pham, Sameer Alam, Su Yi-Lin and Vu Duong **A Machine Learning Approach on Past ADS-B Data to Predict Planning Controller's Actions**	**#46** 12:35 PM — Lu Dai, Yulin Liu and Mark Hansen **In Search of the Upper Limit to Air Traffic Control Communication**	**#40** 12:35 PM — Agnes Tang, Cheng-Lung Wu and David Tan **Quantification of WAFS Weather Forecast Uncertainties and its Effect on Fuel Burn using Historical Flight Data**

Lunch (1:15 - 2:15 pm)

2:15 PM — **Auditorium 001**

Keynote talk — **Parimal H. Kopardekar** | NASA Ames Research Center

Innovate Relentlessly
Embracing innovation in aviation while respecting its safety tradition ★

Coffee / Tea break (3:15 - 3:45 pm)

Paper sessions (3:45 - 5:45 pm)

Classroom 024G	Classroom 025V	Classroom 026V
Track 4: Trajectory Optimization	**Track 2: System Performance**	**Track 3: Fuel and Emissions**
Session Chair: Xavier Prats	*Session Chair: Yu Zhang*	*Session Chair: Joost Ellerbroek*
#30 3:45 PM — Judith Rosenow, David Strunck and Hartmut Fricke **Trajectory Optimization in Daily Operations**	**#65** 3:45 PM — Emmanuel Sunil, Joost Ellerbroek and Jacco Hoekstra **CAMDA: Capacity Assessment Method for Decentralized Air Traffic Control**	**#57** 3:45 PM — Feijia Yin, Volker Grewe, Jesper van Manen, Sigrun Matthes, Hiroshi Yamashita, Florian Linke and Benjamin Lührs **Verification of the Ozone Algorithmic Climate Change Functions for Predicting the Short-term NOx Effects from Aviation En-route**
#74 4:25 PM — Ji Ma, Daniel Delahaye, Mohammed Sbihi and Paolo Scala **Integrated Optimization of Arrival, Departure, and Surface Operations**	**#11** 4:25 PM — Florentin Goyens, François Gonze, Raphaël M. Jungers, Andrea Simonetto, Etienne Huens and Jean Boucquey **A Probabilistic Model for Precedence Rules and Reactionary Delay in Air Traffic Management**	**#91** 4:25 PM — Joost Ellerbroek, Mazin Inaad and Jacco Hoekstra **Fuel and Emission Benefits for Continuous Descent Approaches at Schiphol**
#53 5:05 PM — Ramon Dalmau, Marc Melgosa, Santi Vilardaga and Xavier Prats **A Fast and Flexible Aircraft Trajectory Predictor and Optimiser for ATM Research Applications**	**#95** 5:05 PM — Yu Zhang, Hualong Tang, Dave Knorr and Almira Ramadani **Measuring the Benefits of NextGen Metroplex in Convective Weather: Case Study of North Texas Metroplex**	**#106** 5:05 PM — Shuli Gong **Research on Civil Aircraft Fuel Consumption in Cruise Phase Based on Least Square Support Vector Regression with Genetic Algorithm**

Beach volley & Tapas (>6:15 pm)

Castelldefels beach. Look back page for details.

Time to use your **ICRAT** flip-flops!

Wednesday, June 27

5K Fun Run! (7:00 am)

Sign-in and Breakfast (8:30 - 9:30 am)

9:30 AM | *Auditorium 001*

Keynote talk | **Eric Neiderman -** U.S. Federal Aviation Administration
Vu Duong - Nanyang Technological University Singapore | **Trends in aviation research** ★

Coffee / Tea break (10:30 - 11:00 am)

Tutorial sessions (11:00 am - 1:00 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
11:00 AM Banavar Sridhar	11:00 AM Michael Ball	11:00 AM Damián Rivas
Air Traffic Metrics to Quantify Disruption from Natural and Man-Made Events	**Collaborative Decision Making**	**Analysis of Aircraft Trajectories considering Wind Effects**

Lunch (1:00 - 2:00 pm)

Paper sessions (2:00 - 4:40 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
Track 4: Trajectory Optimization	**Track 5: Advanced Modeling**	**Track 6: Safety**
Session Chair: David Lovell	*Session Chair: Michael Ball*	*Session Chair: Ramon Dalmau*
#67 2:00 PM Martin Lindner, Judith Rosenow and Hartmut Fricke	**#13** 2:00 PM Jerom Maas, Ronald van Gent and Jacco Hoekstra	**#18** 2:00 PM Fedja Netjasov and Dusan Crnogorac
Dynamically Optimized Aircraft Trajectories Affecting the Air Traffic Management	**Object Tracking in Images of an Airborne Wide Angle FMCW Radar**	**Potential Safety Occurences as Indicators of Air Traffic Management Safety Performances: A Network Based Simulation Model**
#70 2:40 PM Guodong Zhu, Peng Wei, Robert Hoffman and Bert Hackney	**#80** 2:40 PM Johannes Mund, Alexander Zouhar and Hartmut Fricke	**#25** 2:40 PM Xavier Olive and Pierre Bieber
Aggregate Multi-commodity Stochastic Models for Collaborative Trajectory Options Program (CTOP)	**Performance Analysis of a LiDAR System for Comprehensive Airport Ground Surveillance under Varying Weather and Lighting Conditions**	**Quantitative Assessments of Runway Excursion Precursors using Mode S Data**
#41 3:20 PM Peter Lubrani, Miguel Angel Pérez Lorenzo, Alexander Dorta Fumero and Manuel Villegas Díaz	**#26** 3:20 PM Parker Vascik, Hamsa Balakrishnan and R. John Hansman	**#63** 3:20 PM Hartmut Fricke, Stanley Foerster and Markus Vogel
Operational validation of the OPTAIN-SA Tool. Supporting optimized profile descent approach sequencing into Palma TMA	**Assessment of Air Traffic Control for Urban Air Mobility and Unmanned Systems**	**Using Agent-Based Modeling to Determine Collision Risk in Complex TMA Environments. The Turn-On-to-ILS-Final Safety Case**
#75 4:00 PM Yulin Liu, Mark Hansen, David Lovell and Michael Ball	**#43** 4:00 PM Md Shohel Ahmed, Sameer Alam and Michael Barlow	
Predicting Aircraft Trajectory Choice – A Nominal Route Approach	**A Multi-Layer Artificial Neural Network Approach for Runway Configuration Prediction**	

Coffee / Tea break (4:40 - 5:10 pm)

Doctoral paper sessions (5:10 - 6:30 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
Session Chair: Yanjun Wang	*Session Chair: Seth Young*	*Session Chair: Dirk Schaefer*
#7 5:10 PM Nika Tkanashvili & Igor Kabashkin	**#98** 5:10 PM Akinori Murata, Daniel Delahaye and Keiki Takadama	**#50** 5:10 PM Mahmut Bakir and Özlem Atalik
Ontology-Based Approach for Human Competency Gap Analysis in Air Traffic Management. A Case Study of Georgia	**Merging Flows and Optimizing Aircraft Scheduling in Terminal Maneuvering Area Based on GA**	**E-service quality performance measurement in airlines: An application on scheduled airlines in Turkey**
#107 5:50 PM Shawn Pruchnicki and David Woods	**#48** 5:50 PM Timo Riedel, Masaki Takahashi and Eri Itoh	**#55** 5:50 PM Şahap Akan and Özlem Atalik
Inadequate Post Simulation Debriefings in Air Traffic Control and Pilot Training	**Conceptual Design of a Speed Command Algorithm for Airborne Spacing Interval Management**	**The airline brand personality in the context of neuromarketing: FSC versus LCC**

Room 028-2

Conference Committee meeting (6:45 pm)

Conference Committee dinner (8:30 pm) Salamanca Restaurant (Barcelona) ⚲ Carrer de Pepe Rubianes, 34. Barcelona

Thursday, June 28

ICRAT '18

Sign-in and Breakfast (8:30 - 9:30 am)

9:30 AM — *Auditorium 001*

Keynote talk | **Miquel Garcia** | **Recent trends in GNSS industry:**
| Rokubun | **accuracy, affordability and robustness**

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Coffee / Tea break (10:30 - 11:00 am)

Tutorial sessions (11:00 am - 1:00 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
11:00 AM Luis Delgado	**11:00 AM** Michael Schultz	**11:00 AM** Kevin-Christian Garzon Galindo, Younes Sellam and Tobias Zocher
Door to Door Perspective	**Simulation from Model to Innovation**	**Student Grand Challenge: Drone supported Weather Analysis at DFW**

Lunch (1:00 - 2:00 pm)

Paper sessions (2:00 - 4:00 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
Track 7 - Complexity and Information	**Track 5 - Advanced Modeling**	**Track 6 - Safety**
Session Chair: Marc Bourgois	*Session Chair: Michael Schultz*	*Session Chair: Daniel Delahaye*
#23 Thomas Dubot **2:00 PM** **Predicting Sector Configuration Transitions with Autoencoder-based Anomaly Detection**	**#52** Alexander Gillissen and Michael Schultz **2:00 PM** **Formal Modeling of Air Traffic as System-of-Systems: Air Traffic as Systems of Interdependent Operational Decision Making Processes**	**#33** Eulalia Hernández-Romero, Alfonso Valenzuela, Damián Rivas, Matthias Steiner and James Pinto **2:00 PM** **Probabilistic Aircraft Conflict Detection in the Terminal Maneuvering Area**
#28 Jacco Hoekstra, Joost Ellerbroek, Emmanuel Sunil and Jerom Maas **2:40 PM** **Geovectoring: Reducing Traffic Complexity to Increase the Capacity of UAV airspace**	**#19** Junzi Sun, Henk A.P. Blom, Joost Ellerbroek and Jacco Hoekstra **2:40 PM** **Aircraft Mass and Thrust Estimation Using Recursive Bayesian Method**	**#79** Ying Huo, Daniel Delahaye and Yanjun Wang **2:40 PM** **Sensitivity Analysis of Closest Point of Approach**
#77 Ivan Tereshchenko and Mark Hansen **3:20 PM** **Relative Trajectory Cost Estimation for CTOP Applications Using Multivariate Nonparametric Finite Mixture Logit**	**#92** Michael Schultz and Stefan Reitmann **3:20 PM** **Prediction of Passenger Boarding Process using Neural Network Approach**	**#10** Richard Alligier, Nicolas Durand and Gregory Alligier **3:20 PM** **Efficient Conflict Detection for Conflict Resolution**

Coffee / Tea break (4:00 - 4:30 pm)

Doctoral paper session (4:30 - 5:50 pm)

Classroom 024G	*Classroom 025V*	*Classroom 026V*
Session Chair: Luis Delgado	*Session Chair: Kurtulus Izzetoglu*	*Session Chair: Vu Duong*
#15 Hee Wei Gary Foo and Zhao-Wei Zhong **4:30 PM** **Egg-shaped conflict envelopes with Fuzzy logic for airspace Collision Risk Modelling**	**#39** Kwangyeon Kim and Inseok Hwang **4:30 PM** **Terminal Airspace Anomaly Detection Using Temporal Logic Learning**	**#51** Aymeric Cretin, Bruno Legeard, Fabien Peureux and Alexandre Vernotte **4:30 PM** **Increasing the Resilience of ATC systems against False Data Injection Attacks using DSL-based Testing**
#86 Emrah Durmaz and Ünal Battal **5:10 PM** **Valuation of Public Guarantees with Real Option: New Istanbul Airport Example**	**#49** Max Li and Megan Ryerson **5:10 PM** **Detection of individual anomalous arrival trajectories within the terminal airspace using persistent homology**	**#59** Jungwoo Cho and Yoonjin Yoon **5:10 PM** **Assessing the airspace availability for sUAV operations in urban environments: A topological approach using keep-in and keep-out geofence**

ICRAT 2018 Gala Dinner (8:20 pm)

Old Moritz Brewery Barcelona ⊙ Ronda de Sant Antoni, 41. Barcelona

Please, bring your badge to the dinner

This event is free of charge for all ICRAT registered participants that conveniently checked the gala dinner option in the registration form. If you are changing your mind regarding your choice, please inform at the Registration Desk as soon as possible.

A welcome cocktail will start in the basement of the Old Moritz Brewery at 8:20 pm followed by the Gala Dinner.
Two buses will depart from the **East entry of the UPC campus at 6:15 pm and 7:45 pm.** If you prefer to go on your own to Barcelona and have a stroll there before, just join us directly at the Brewery.

Buses back to Castelldefels will be arranged after the dinner.

Friday, June 29

ICRAT'18

🍞 Sign-in and Breakfast (8:10 - 9:10 am)

🎓 Doctoral paper sessions (9:10 - 10:30 am)

Classroom 024G	Classroom 025V
Session Chair: Richard Alligier	Session Chair: Seth Young

#90 9:10 AM — Hamza Taheri and Abdelouahid Lyhyaoui
Airport ground traffic optimisation

#78 9:10 AM — Hejar Gürlük
Flight Data Handling with Augmented Reality

#100 9:50 AM — Yuan Wang and Yu Zhang
Dynamic Prediction of Runway Configuration and Airport Acceptance Rate

#17 9:50 AM — Wei Dai, Yue Hu and Yifei Zhao
A Study on the Mechanism and Prediction of Flight Delay with ADS-B Surveillance Data

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☕ Coffee / Tea break (10:30 - 11:00 am)

📄 Paper sessions (11:00am - 1:00 pm)

Classroom 024G	Classroom 025V	Classroom 026V
Track 8 - Unmanned Aerial Systems	**Track 9 - Network Management**	**Track 6 - Safety**
Session Chair: Hartmut Fricke	Session Chair: Damián Rivas	Session Chair: Jacco Hoekstra

#03 11:00 AM — Xuxi Yang and Peng Wei
Autonomous On-Demand Free Flight Operations in Urban Air Mobility using Monte Carlo Tree Search

#12 11:00 AM — Alexander Estes, David Lovell and Michael Ball
Selecting Parameters in Performance - Based Ground Delay Program Planning

#34 11:00 AM — Guido Manfredi and Yannick Jestin
An Introduction to Fast Time Simulations for RPAS Collision Avoidance System Evaluation

#24 11:40 AM — Marc Brittain and Peng Wei
Autonomous Aircraft Sequencing and Separation with Hierarchical Deep Reinforcement Learning

#58 11:40 AM — Seddik Belkoura and Samuel Cristóbal
New Insights on Nonlinear Delay Causation Network for Passengers and Flights in Europe

#66 11:40 AM — Emmanuel Sunil, Ólafur Þórðarson, Joost Ellerbroek and Jacco Hoekstra
Analyzing the Effect of Traffic Scenario Properties on Conflict Count Models

#69 12:20 PM — Augustin Degas, Elsy Kaddoum, Marie-Pierre Gleizes, Françoise Adreit and Arcady Rantrua
Dynamic Collision Avoidance using Local Cooperative Airplanes Decisions

#94 12:20 PM — Goce Nikolovski, Vincent Treve and Floris Herrema
Local TBS Delay Reduction Effect on Global Network Operations

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🥖 Lunch (1:00 - 2:00 pm)

📄 Paper sessions (2:00 - 3:20 pm)

Classroom 024G	Classroom 025V	Classroom 026V
Track 8 - Unmanned Aerial Systems	**Track 9 - Network Management**	**Track 10 - Economics and Policy**
Session Chair: Nicolas Durand	Session Chair: Eric Neiderman	Session Chair: David Lovell

#71 2:00 PM — Leonid Sedov and Valentin Polishchuk
Centralized and Distributed UTM in Layered Airspace

#96 2:00 PM — Yan Xu, Ramon Dalmau, Marc Melgosa, Adeline Montlaur and Xavier Prats
Alternative Trajectory Options for Delay Reduction in Demand and Capacity Balancing

#21 2:00 PM — Daniel Suh
Predicting a Dramatic Contraction in the 10-Year Passenger Demand

#76 2:40 PM — Richard Alligier, Cyril Allignol, Nicolas Barnier, Nicolas Durand and Ruixin Wang
Detect and Avoid Algorithm for UAS with 3D-Maneuvers

#99 2:40 PM — Miguel Antonio Mujica and Rodrigo Romero Silva
Analysing the Decision Rules for a Ground Delay Program: Mexican Airport Network

#64 2:40 PM — Pedro García-Albertos, Oliva G. Cantú Ros and Ricardo Herranz
Analyzing Door to Door Travel Times Through Mobile Phone Data

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🎖 Auditorium 001

3:20 PM **Awards and Closing Remarks**

Thank you,
and have a save journey!

UPC campus map

To train Station
C-32
Escola d'enginyeria de telecomunicació i aeroespacial de Castelldefels
P
E95 Bus
E95 Bus
UPC Campus East Entry
Student Dorms

Conference venue

ICRAT *Back-Office*
Registration
027-3
028-1
028-2
030
Entrance
Auditorium 001
Classroom 025V
Classroom 026V
Classroom 024G
021B
022B
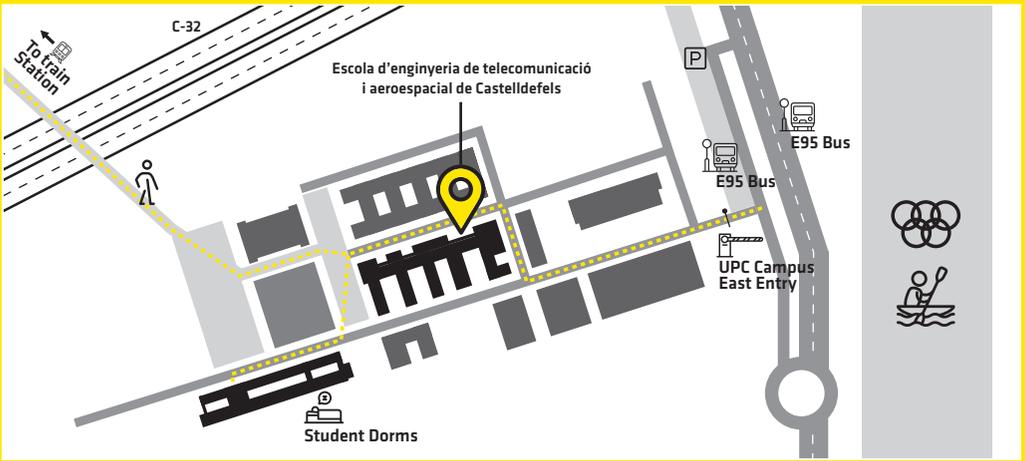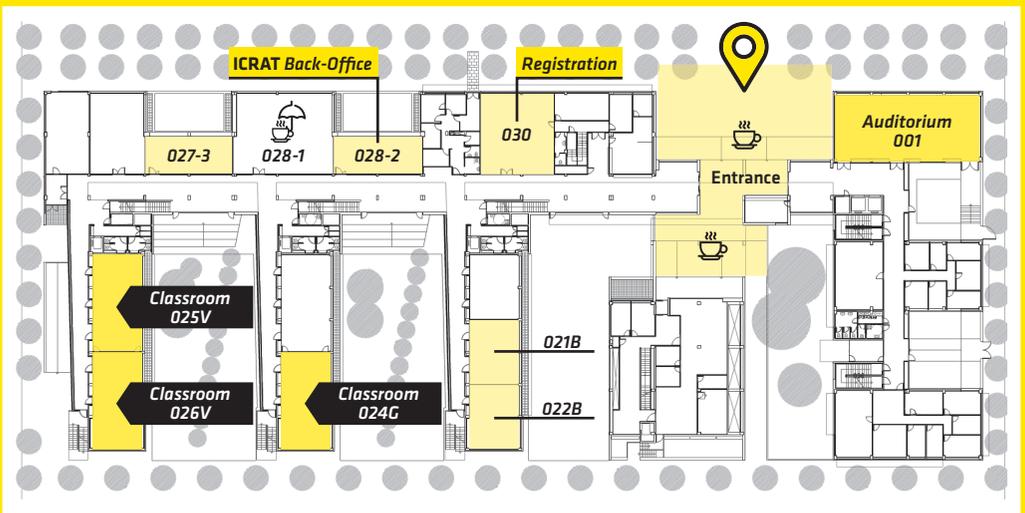
Classrooms available
for private meetings or rehearsals:

027-3 / 021B / 022B

From UPC to the beach

UPC campus
Chalito beach bar
Mediterranean Sea

Beach volley & Tapas
Tuesday June 26th

After the conference, a couple of beach volleyball nets are waiting for us next to a strategically located beach bar!!

We will meet at 6:15 pm at the **East entry of the UPC campus** and walk together towards de beach. Yet, feel free to join us at any time (see map on the right). You can play volley, sunbath, swim or just relax with a beer watching how well your peers perform at volley.

At 8:00 pm approximately, an informal *tapas* dinner will be served for ICRAT registered participants at *Chalito* beach bar. You can order drinks free of charge during the dinner. Before / after the dinner, you will have to pay for any extra drink or food.

5K fun run !
Wednesday June 27th

Following a long-standing tradition in ICRAT and ATM Seminar, the 5 km fun run will start on Wednesday at 7:00 am sharp. We will meet at 6:45 am at the **East entry of the UPC campus**. After a short briefing, we will cross the *Canal Olímpic* Avenue and start the run. Part of the course will be along the beach and will finish there, so prepare to take a healthy and reinvigorating early morning bath afterwards. For those too lazy to run, you can always meet us at the *Chalito* beach bar to see our brave runners arriving at the finish line.
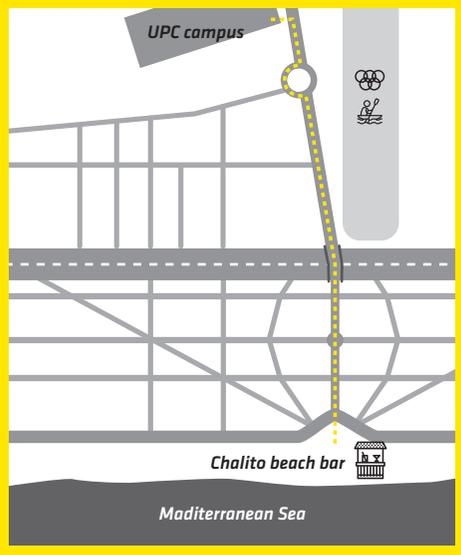
WIFI networks at UPC campus:

eduroam:
Preferred option if you have already an eduroam account.

UPCguest:
Follow the instructions and Sign up. You will need to provide a valid e-mail address and mobile phone number. You will receive an SMS with a password to log-in.

Graphic design: aelou.cat

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