IPIN 2017
SAPPORO

IPIN 2017

EIGHTH INTERNATIONAL CONFERENCE ON
INDOOR POSITIONING AND INDOOR NAVIGATION

18-21 September, 2017
Sapporo, Japan

HOKKAIDO UNIVERSITY

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PRESENTATION

Welcome to the Eighth International Conference on Indoor Positioning and Indoor Navigation, IPIN 2017, and welcome to Sapporo, Japan. Starting in 1869, the city of Sapporo was redeveloped by the Hokkaido Development Commission into a planned city that followed the model of Kyoto. The Sapporo area, located between the south mountain area and the north coastline, was previously a wetland. However, after a soil improvement that was conducted, the land in this area became rich and fertile. The border between the improved area and the wetland remains on the Hokkaido University campus, where, in front of the convention hall, you can see a wide expanse of trees and some ponds, as well as a small, farmed river. These features serve to remind us of the history of our environment.

From the first IPIN, IPIN2010, held in Zurich (Switzerland), the conference has been an excellent forum dedicated to indoor positioning and indoor navigation. In particular, the demonstration of research products was useful for developing practical devices and systems for positioning and navigation. Subsequent editions, held in Guimaraes (Portugal), Sydney (Australia), Montbeliard (France), Busan (Korea), Banff (Canada), and Alcara de Henares (Spain) have also shown that there is a large and active community working in this sector.

Same as the last edition, the IPIN2017 Technical Program Committee (TPC) requested two types of submissions: regular papers (limited to eight double-column pages, preferably for an oral presentation) and works-in-progress (limited to four double-column pages, preferably for poster presentations). IPIN2017 received 216 contributions (147 regular papers and 69 works-in-progress). Both types of manuscripts followed a peer review process wherein the TPC selected 102 contributions for oral presentations and 63 for poster presentations. The IPIN2017 Technical Program consists of 16 oral sessions and two poster sessions, covering a broad range of indoor positioning and navigation topics. The regular papers presented at the conference will be submitted to the IEEE Xplore Digital Library, and the authors of both types of papers will have the opportunity to send technically extended versions of their conference papers to IEEE Transactions on Instrumentation and Measurement. Recognition for the best papers will be awarded during the Conference.

We would like to express our gratitude to everyone involved in the events at this conference, and we are particularly indebted to Hokkaido University's Graduate School of Information Science and Technology and university administration office for the facilities and support they provided. We would also like to acknowledge and offer our thanks for the support of our technical sponsors, the IEEE Instrumentation and Measurement Society and IEEE Japan Section, our Competition Sponsors, and the financial support from the city of Sapporo, Hokkaido prefecture, and The Secom Science and Technology Foundation.

We would also recognize the members of the TPC have done a remarkable job of reviewing the papers submitted to the conference in such a short time. Furthermore, IPIN2017 has been made possible thanks to the hard work of the members of the organizing committees as well as the competition chairs.

Finally, we want to thank you for coming to IPIN2017. The success of this event will depend on the contributions you make. We hope you enjoy our conference and the beautiful City of Sapporo.

September 2017
Prof. Hideo Makino and Prof. Jesús Ureña
Conference Co-Chairs

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DETAILED PROGRAM

SATURDAY, 16 SEPTEMBER - MONDAY, 18 SEPTEMBER

Competition

- Track 1 : Smartphone-based
- Track 2 : Pedestrian dead reckoning

MONDAY, 18 SEPTEMBER

09:00	–18:00	Registration. Hall/Foyer (except 12:00 – 13:00)
10:00	–12:00	Workshop. Room-4 Third Asia-Pacific Workshop on Precise Indoor Positioning and Indoor Navigation (APIPIN)
12:00	–13:00	Lunch on your own
13:00	–16:00	Tutorial. Room-Y Pedestrian Dead-Reckoning (PDR)
16:00	–16:20	Coffee Break. Hall/Foyer
16:20	–17:40	Opening Plenary Session. Auditorium Chairperson : Jesus Urena · Opening remark (16:20 –) : Prof. Hideo Makino, Niigata University, Japan · Keynote 1 (16:40 –): "Accurate 3D Indoor Location during Emergencies" ***Dr. Maria Garcia Puyol, Google, USA***
18:00	–	Reception. Hall/Foyer

TUESDAY, 19 SEPTEMBER

08:20 –18:00 Registration: Hall/Foyer (except 12:00 – 13:00)

09:00 –10:00 Keynote 2. Auditorium

Chairperson : Takeshi Kurata

· "Indoor Turn-by-turn Navigation for the Blind"

Mr. Kazuhiro Sadakiyo, Shimizu Corporation, Japan and Dr. Hironobu Takagi, IBM Research - Tokyo, Japan

10:00 –10:15 Coffee Break. Hall/Foyer

10:15 –12:15 Parallel Sessions

SS-1 (Special Session). Seamless LBS: From QZSS to Indoor LBS. Auditorium

Chairperson : Naohiko Kohtake

· Introduction

Prof. Naohiko Kohtake, Keio Univ., Japan

· The Brand New Constellation Providing Precise PNT, Japanese Regional SatNav System, Michibiki

Mr. Satoichi Kogure, National Space Policy Secretariat, Cabinet Office for Japan, Japan

· Current Status of Japanese Indoor Positioning Technology

Mr. Susumu Yoshitomi, Secretary General, Japanese Indoor Positioning Technology Consortium, Japan

A-1. UWB. Room-A

Chairperson : TBD

24 An Integrated IMU and UWB Based Indoor Positioning System
Yao Leehter, Wu Yeong Wei Andy, Yao Lei and Liao Zhe Zheng

96 Robust Decentralized Localization in Impulsive Noise
Yang Song, Wee Peng Tay and Choi Look Law

104 Finding objects using UWB or BLE localization technology: A museum-like use case
Antonio R. Jiménez Ruiz and Fernando Seco

130 Towards Real-time Time-of-Arrival Self-Calibration using Ultra-Wideband Anchors
Kenneth Batstone, Magnus Oskarsson and Kalle Åström

143 Practical Challenges of Particle Filter Based UWB Localization in Vehicular Environments
Daniel Knobloch

B-1. Evaluation. Room-B

Chairperson : TBD

6 A More Realistic Error Distance Calculation for WiFi Indoor Positioning Systems Accuracy Evaluation
Germán Martín Mendoza-Silva, Joaquín Torres-Sospedra and Joaquín Huerta

59 Performance comparison of wearable-based pedestrian navigation systems in large areas
Dina Bousdar, Luis Enrique Diez Blanco and Estefania Munoz Diaz

78 IMU Dataset For Motion and Device Mode Classification
Parinaz Kasebzadeh, Gustaf Hendeby, Carsten Fritsche, Fredrik Gunnarsson and Fredrik Gustafsson

84 MagPIE: A Dataset for Indoor Positioning with Magnetic Anomalies
David Hanley, Alexander Faustino, Scott Zelman, David Degenhardt and Timothy Bretl

154 Indoor Performance Analysis of LF-RFID based Positioning System: Comparison with UHF- RFID and UWB
Vighnesh Gharat, Elizabeth Colin, Geneviève Baudoin and Damien Richard

12:15 –13:15 Lunch. Hall/Foyer

13:00 –14:30 Cultural Program (Sado/Japanese Tea Ceremony). Hall/Foyer

13:15 –14:45 Coffee Break. Hall/Foyer

13:15 –14:45 Poster Session (41 presentations). Room-Y, Room-Z, Corridor from Y to Z
(Posters are put up from 9:00)

22 Indoor Mapping for Smart Cities- an affordable approach
Tanishq Gupta and Holden Li

23 Calibration of Smartphone Sensor Data Usable for Pedestrian Dead Reckoning
Thomas Moder, Clemens Reitbauer, Markus Dorn and Manfred Wieser

28 Multiple simultaneous Wi-Fi measurements in fingerprinting indoor positioning
Adriano Moreira, Ivo Silva, Filipe Meneses, Maria João Nicolau, Cristiano Pendão and Joaquín Torres-Sospedra

35 Comprehensive Survey of Similarity Measures for Ranked Based Location Fingerprinting Algorithm
Georgy Minaev, Ari Visa and Robert Piche

55 A Novel Methodology to Estimate a Measurement of the Inherent Difficulty of an Indoor Localization Radio Map
Emilio Sansano, Raul Montoliu and Joaquín Torres-Sospedra

57 Vehicle Localization Based on Odometry Assisted Magnetic Matching
Dongyan Wei, xinchun ji, Wen Li and Hong Yuan

72 A Robust Floor Localization Method Using Inertial and Barometer Measurements
Zhengyi Xu, Jianming Wei, Jinxin Zhu and Weijun Yang

86 Indoor Location Estimation Based on Robust Floor Fingerprint Identification
Kaoru Uchida and Satoru Fujita

97 Landmark-Based Online Drift Compensation Algorithm for Inertial Pedestrian Navigation
Estefania Munoz Diaz and Maria Caamano

18 A Testbed for LTE-Wi-Fi Indoor and Outdoor Positioning for End-User Localisation
Seppo Horsmanheimo, Matti Laukkanen, Lotta Tuomimaki, ibbad hafeez, Vicent Ferrer Gausch, Jose Costa-Requena, Harri Povelainen and Sasu Tarkoma

119 Floor Detection Using a Barometer Sensor in a Smartphone
Seongsik Kim, Jaewon Kim and Dongsoo Han

158 Time-of-arrival-based Smartphone Localization Using Visible Light Communication
Takayuki Akiyama, Masanori Sugimoto and Hiromichi Hashizume

160 FCT:An Indoor Position Prediction Algorithm Based on Spatio-Temporal Feature Association
Wen Liu, Zhongliang Deng, Senjie Zhang and Lexuan Lin

161 BaR: Barometer based Room-level Positioning
Hideaki NII, Romain FONTUGNE, Yojiro UO and Keiichi SHIMA

162 Analysis of prostate cancer patients' stay time in Gunma University Heavy Ion Medical Center using RFID Technology
Partha Protim Hazarika, Kota Torikai, Ryoji Suzuki, Shinichi Tsujimura and Yuichiro Saito

165 An Automatic Attendance Checking System using Smartphones: An Infrastructureless Approach
Selin Chun, Myungchul Kwak, Minkyung Park and Taekyoung Kwon

166 A Post Rectification approach of Depth images of Kinect v2 for 3D Reconstruction of Indoor Scenes
Libin Yuan, Jichao Jiao, Zhongliang Deng and Qi Wu

167 Accurate Indoor Localization through Constrained Visual SLAM
Olivier Gomez, Achkan Salehi, Vincent Gay-Bellile and Mathieu Carrier

168 A New Solution for UWB localization: Online Algorithms, Implementation and Testbed
Hassan Nahas, Asfandyar Sirhindi and Nikolaos Freris

171 Indoor-positioning using RSSI: DOD-based technique versus RSSI-ranging technique
Naoki Honma, Ryota Tazawa, Kota Kikuchi, Astushi Miura, Yusuke Sugawara and Hiroto Minamizawa

172 A Wireless Phase Compensation Method among Asynchronous Anchor Clocks for TDOA
Koichi Takizawa and Takashi Ishihara

173 Analysis of the Spatial Resolution of Wi-Fi RSSI
weixing Xue, Xianghong Hua, Weining Qiu and Wei Zhang

177 Analysis and Discrimination of Ranging Error Based on Obstacle Experiments
Yuan Yang, Chenchen Zhang, Peng Dai, Xiaoyu Bao, Leng Han and Qing Wang

178 Multi-pedestrian tracking by moving Bluetooth-LE beacons and stationary receivers
Oliver Schmidts, Maik Boltes, Bodo Kraft and Marc Schreiber

179 A Preliminary Study on Location Estimation without Preparation using Ceiling Signboard
Yoshihiro Sugaya, Kenta Takeda, Tomo Miyazaki and Shinichiro Omachi

180 A Complete Universal Localization Solution
Yew Fei Tang, Yanxiang Zhang and Siew Leong Kan

183 A step towards effortless Indoor Positioning System using RSSI based Path Loss Model Maps
Muhammad Usman Ali, Soojung Hur and Yongwan Park

184 Acquisition of indoor area information for evacuation support in ERESS
Koki Matsumoto, Ken Komaki, Kazuki Uemura, Shingo Nakajima, Tomotaka Wada and Kazuhiro Ohtsuki

185 Visible Light Positioning Using Fisheye Lens and Dual-facing Cameras for Coverage Area Expansion
Yohei Nakazawa, Hideo Makino, Kentaro Nishimori, Daisuke Wakatsuki, Makoto Kobayashi and Hideki Komagata

186 Vision-Aided Indoor Pedestrian Tracking System
JINGJING YAN and Gengen He

189 UHF RFID system with metal circular cylinder for indoor position estimation
Takeshi Kawamura, Mitsuo Hirohashi and Yasutaka Kishimoto

190 Principal Gradient Direction Based WiFi Indoor Positioning Strategy
Wei Zhang, Xianghong Hua, Kegen Yu, Weining Qiu, Weixing Xue and Xin Chang

191 Unified Navigation Graph Model of Indoor Space and Outdoor Space
hengcai zhang and Feng Lu

192 Development of Precise Indoor Location System Using Multi-directional Beacon
Sang-Hoon Yoo, Jung-Yoon Park, Jong-Hyuk Lee and Tae-Kyung Sung

193 Patient Activity Monitoring for Smartphones based on a PDR Algorithm
David Gualda, Edel Díaz, Juan Jesus Garcia, Maria del Carmen Perez, Jesús Ureña Ureña and Rubén Cervigón

194 GPS Signal Generation Platform for Seamless Localization
Marcelo Koti Kamada, Hiromichi Hashizume and Masanori Sugimoto

195 Fusion of a RFID Reader and UWB Module Applicable to smart devices
Dongyeop Kang, Kiyoung Moon, Jaeheon Lee, Jinho Ko and Youngjae Lee

197 Towards a Cooperative Indoor Positioning System based on Wireless Network
Issa Abdoua, Philippe CANALDA and François Spies

200 Recognizing ADLs Based on Non-intrusive Environmental Sensing and BLE Beacons
Long Niu, Sachio Saiki and Masahide Nakamura

201 Moving Control Method with RFID and Infrared Laser Radar for Indoor Mobile Robot Navigation

Yuki Yagi, Bin Sun and Tomotaka Wada

211 Practical Evaluation Framework for PDR Compared to Reference Localization Methods

Ryosuke Ichikari, Ching-Tzun Chang, Masakatsu Kourogi, Takashi Okuma and Takeshi Kurata

14:45 –16:45 Parallel Sessions

SS-2 (Special Session). Standardization and Indoor Navigation for the Blind. Auditorium

Chairperson : Nayeem Hoq

· Introduction

Mr. Nayeem Hoq, FAA, USA

· Blind Navigation - Challenges, Research and Future Activities

Dr. Nicholas Giudice, Univ. of Maine, USA

· Lessons Learned from Blind Navigation projects around the globe

Mr. Rob Nevin, U-R-Able, Canada

· Blind Navigation Research at IBM

Dr. Hironobu Takagi, IBM Research - Tokyo, Japan

· Introduction of IPIN Standards Committee

Prof. Hiromich Hashizume, National Institute of Informatics, Japan

· Blind Navigation Research

Prof. Hideo Makino, Niigata University, Japan

· Question and Answer

A-2. Wireless Sensor Network 1. Room-A

Chairperson : TBD

20 A Multiobjective Optimization Methodology of Tuning Indoor Positioning Systems
Grigorios G. Anagnostopoulos, Michel Deriaz and Dimitri Konstantas

40 Interference Effect on the Performance of Fingerprinting Localization
Arash Behboodi, Filip Lemic, Adam Wolisz and Rudolf Mathar

77 Efficient Wi-Fi Signal Strength Maps Using Sparse Gaussian Process Models
Mostafa Sakr and Naser El-Sheimy

95 Grid-Based Belief Propagation
Yang Song, Chong Xiao Wang, Wee Peng Tay and Choi Look Law

115 Signal Strength Indoor Localization using a Single DASH7 Message
Rafael Berkvens, Ben Bellekens and Maarten Weyn

B-2. Hybrid1. Room-B

Chairperson : TBD

54 Integrating Known Locations in FootSLAM and Investigating the Influence of Different Prior Information
Susanna Kaiser

101 Recovering from Sample Impoverishment in Context of Indoor Localisation
Toni Fetzer, Frank Ebner, Marcin Grzegorzek and Frank Deinzer

114 Real time 3D Indoor Localization
Wojciech Jaworski, Paweł Wilk, Paweł Zborowski, Witold Chmielowiec, Andrew YongGwon Lee and Abhishek Kumar

128 Foot-mounted pedestrian navigation reference with tightly coupled GNSS carrier phases, inertial and magnetic data
Julien Le Scornec, Valérie Renaudin and Miguel Ortiz

156 Post-processing optimization of piecewise indoor trajectories based on IMU and RSS measurements
Kersane Zoubert-Ousseni, Christophe Villien and François Le Gland

16:45 –17:00 Coffee Break. Hall/Foyer

17:00 –19:00 Parallel Sessions

SS-3 (Special Session). Best Paper Candidates. Auditorium

Chairpersons : Hideo Makino, Jesus Urena

155 A Novel Approach for Dynamic Vertical Indoor Mapping through Crowd-sourced Smartphone Sensor Data
Georgios Pipelidis, Omid Reza Moslehi Rad, Christian prehofer, Dorota Iwaszczuk and Urs Hugentobler

152 SoLoc: Self-organizing Indoor Localization for Unstructured and Dynamic Environment
Duc Le and Paul Havinga

56 IndoorLoc Platform: A Public Repository for Comparing and Evaluating Indoor Positioning Systems
Raul Montoliu, Emilio Sansano, Joaquín Torres-Sospedra and Oscar Belmonte

49 Pedestrian Track Estimation with Handheld Monocular Camera and Inertial-Magnetic Sensor for Urban Augmented Reality
Nicolas Antigny, Myriam Servières and Valérie Renaudin

53 Scalable and Precise Multi-UAV Indoor Navigation using TDOA-based UWB Localization
Janis Tiemann and Christian Wietfeld

A-3. Ultrasound. Room-A

Chairperson : TBD

32 Enhanced still presence sensing with supervised learning over segmented ultrasonic reflections
Abbass Hammoud, Michel Deriaz, Dimitri Konstantas and Athanasios Kyritsis

138 Experimental Validation for Opto-Acoustic Distance Measurement based on Code Division Multiple Access Amplitude Modulation and Differential Carrier Phase Estimation
Philipp Rapp, Dominik Esslinger, Oliver Sawodny and Cristina Tarin

139 ARABIS: an Asynchronous Acoustic Indoor Positioning System for Mobile Devices
Yu-Ting Wang, Jun Li, Rong Zheng and Dongmei Zhao

B-3. Hybrid2. Room-B

Chairperson : TBD

68 Robust Pedestrian Dead Reckoning using Anchor Point Recalibration
Eike Jens Hoffmann, Lorenz Schauer, Mirco Schönfeld and Maximilian Kraus

107 Stride detection for pedestrian trajectoryreconstruction: a machine learning approach basedon geometric patterns
Bertand Beaufils, Frédéric Chazal, Marc Grelet and Bertrand Michel

148 An Indoor Positioning System Using Pedestrian Dead Reckoning with WiFi and Map-matching Aided
Khanh Nguyen-Huu, KyungHo Lee and Seon-Woo Lee

19:00 – Dinner on your own

WEDNESDAY, 20 SEPTEMBER

08:20 –18:00 Registration: Hall/Foyer (except 12:00 – 13:00)

09:00 –11:00 Parallel Sessions

SS-4(Special Session): Security in IPIN. Auditorium

Chairperson: Hideo Makino

- Correct position - for sure?

  Mr. Linus Thrybom, ABB AB, Sweden

A-4. Wireless Sensor Network 2. Room-A

Chairperson : TBD

61 Robust WiFi-based Indoor Localization using Multipath Component Analysis

Alexandra Zayets and Eckehard Steinbach

64 Occupancy Detection by Multi-Power Bluetooth Low Energy Beaconing

Paolo Barsocchi, Antonino Crivello, Michele Girolami, Fabio Mavilia and Filippo Palumbo

103 Adaptive Probabilistic Model Using Angle of Arrival Estimation for IoT Indoor Localization

Noori BniLam, Glenn Ergeerts, Dragan Subotic, Jan Steckel and Maarten Weyn

110 Assessing the Impact of Multi-Channel BLE Beacons on Fingerprint-based Positioning

Jovan Powar, Chao Gao and Robert Harle

142 Multi-Frequency Sub-1 GHz Radio Tomographic Imaging in a Complex Indoor Environment

Stijn Denis, Rafael Berkvens, Glenn Ergeerts and Maarten Weyn

B-4. Multi IMUs. Room-B

Chairperson : TBD

41 Step-Size Estimation Using Fusion of Multiple Wearable Inertial Sensors
Chandra Tjhai and Kyle O'Keefe

46 Exploiting wearable devices for the calibration of inertial navigation systems
Dina Bousdar, Estefania Munoz Diaz and Jose Angel Conejo Minguez

62 On the noise and power performance of a shoe-mounted multi-IMU inertial positioning system
Subhojyoti Bose, Amit Gupta and Peter Handel

67 Improving Foot-Mounted Inertial Navigation Through Real-Time Motion Classification
Brandon Wagstaff, Valentin Peretroukhin and Jonathan Kelly

124 On-The-Fly Geometric Calibration of Inertial Sensor Arrays
Håkan Carlsson, Isaac Skog and Joakim Jalden

11:00 –11:15 Coffee Break. Hall/Foyer

11:15 –13:15 Parallel Sessions

SS-5(Special Session): Value Creation in LBS (Location-Based Services). Auditorium

Chairperson : Takeshi Kurata

・On Location Based Services using Visible Light Communication
Mr. Onno Janssen, Philips Lighting, the Netherlands

· Case studies of IPIN services in Japan: Advanced trials and implementations in service and manufacturing fields (tentative)
Dr. Masakatsu Kourogi, AIST/SightSensing, Japan and Dr. Tomohiro Fukuhara, Multisoup, Japan

A-5. Wireless Sensor Network 3. Room-A

Chairperson : TBD

3 Indoor Localization based on Hybrid Wi-Fi Hotspots
Xiaolong Xu, Yu Tang and Shanchang Li

19 SLSR: A Flexible Middle-Ware Localization Service Architecture
Filip Lemic, Vlado Handziski, Ivan Azcarate, John Wawrzynek, Jan Rabaey and Adam Wolisz

36 Deep Learning for Weights Training and Indoor Positioning Using Multi-sensor Fingerprint
Gan Xingli, Yu Baoguo, Huang Lu and Li Yaning

69 Design of Fingerprinting Technique For Indoor Localization Using AM Radio Signals
Md Mahbubur Rahman, Vahideh Moghtadaiee and Andrew G. Dempster

127 Joint Positioning and Radio Map Generation Based on Stochastic Variational Bayesian Inference for FWIPS
Caifa Zhou and Yang Gu

B-5. Vehicle/Robot. Room-B

Chairperson : TBD

30 A Synergetic Approach to Indoor Navigation and Mapping for Aerial Reconnaissance and Surveillance
Silvia Prophet, Jamal Atman and Gert F. Trommer

34 Semi-Supervised Learning for Mobile Robot Localization using Wireless Signal Strengths
Jaehyun Yoo and Karl Johansson

74 Map-Aided Multi-Level Indoor Vehicle Positioning
Carsten Fritsche, Rickard Karlsson, Olle Noren and Fredrik Gustafsson

129 A Nearly Optimal Landmark Deployment for Indoor Localisation with Limited Sensing
Valerio Magnago, Luigi Palopoli, Roberto Passerone, Daniele Fontanelli and David Macii

136 5-DoF Monocular Visual Localization Over Grid Based Floor
Manash Pratim Das, Gaurav Gardi and Jayanta Mukhopadhyay

13:00 –18:25 Exhibition. Hall/Foyer

13:15 –14:55 Lunch. Hall/Foyer

14:55 –16:55 Parallel Sessions

S-6. App/Context 1. Auditorium

Chairperson : TBD

26 Subway Station Real-time Indoor Positioning System for Cell Phones
Chengqi Ma, Chenyang Wan, Yuen Wun Chau, Moon Kang Soong and David Selviah

42 Colorful PDR: Colorizing PDR with Shopping Context in Walking
Kohei Kanagu, Kota Tsubouchi and Nobuhiko Nishio

45 A Convolutional Neural Networks based Transportation Mode Identification Algorithm
gong yanyun, zhao fang, chen shaomeng and luo haiyong

63 Real-time Monitoring for Structure Deformations Using Hand-held RTK-GNSS Receivers on the Wall
So Takahashi, Nobuaki Kubo, Norihiro Yamaguchi and Takashi Yokoshima

109 Decomposition of pedestrian flow heatmap obtained with monitor-based tracking
Akinori Asahara

A-6. Wireless Sensor Network 4. Room-A

Chairperson : TBD

4 User Positioning with Particle Swarm Optimization
Yi Wang

17 Autonomous Signal Source Displacement Detection and Recalibration of Fingerprinting-based Indoor Localization Systems
Ngewi Fet, Marcus Handte and Pedro Jose Marron

43 A Caliration-free Indoor Localization System Using Pseudo-distances in WLAN Environments
YONGHAO ZHAO, Wai-Choong Wong and Hari Krishna Garg

70 Towards zero configuration for Wi-Fi Indoor Positioning System
David Jacq, Francois Spies, Pascal Chatonnay, Christelle Bloch and Philippe Canalda

B-6. SLAM/Site Survey. Room-B

Chairperson : TBD

44 WiFi based trajectory alignment, calibration and crowdsourced site survey using smart phones and foot-mounted IMUs
Yang Gu, Caifa Zhou, Andreas Wieser and Zhimin Zhou

47 RadarSLAM: Biomimetic SLAM using Ultra-Wideband Pulse-Echo Radar
Girmi Schouten and Jan Steckel

80 Simultaneous Localization and Mapping for Pedestrians using Low-Cost Ultra-Wideband System and Gyroscope
Christian Gentner and Markus Ulmschneider

111 Crowd-Assisted Radio Map Construction for Wi-Fi Positioning Systems
Jeonghee Ahn and Dongsoo Han

118 Autocalibration of a wireless positioning network with a FastSLAM algorithm
Fernando Seco and Antonio R. Jiménez Ruiz

16:55 –18:25 Coffee Break. Hall/Foyer

16:55 –18:25 Poster Session (40 presentations). Room-Y, Room-Z, Corridor from Y to Z

(Posters are put up from 9:00)

98 Study of Cooperative Position Estimations of Mobile Robots
David Gualda, Jesús Ureña Ureña, Juan Carlos Garcia, Maria del Carmen Perez and Edel Díaz

106 Magnetic-Field Indoor Positioning System Based on Automatic Spatial-Segmentation Strategy
YICHEN DU and Tughrul Arslan

112 Improved Indoor Localization System based on Virtual Access Points in a Wi-Fi Environment by Filtering Schemes
Boney Labinghisa, Gu Sam Park and Dong Myung Lee

120 Real-Time Identification of NLOS Range Measurements for Enhanced UWB Localization
Karthikeyan Gururaj, Anojh Kumaran Rajendra, Yang Song, Law Choi Look and Guofa Cai

125 Bluetooth Localization Based on Fuzzy Models and Particle Swarm Optimization
Simon Tomazic and Igor Škrjanc

137 Synchronization-free TDoA localization method for large scale wireless networks
Tomasz Jankowski and Maciej Nikodem

141 Isolated Beacon Identification Using a Statistical Approach
Arief Juri, Tughrul Arslan and Yichen Du

149 Binary Fingerprinting-Based Indoor Positioning Systems
marouan mizmizi and Luca Reggiani

182 Development of SLAM-Aiding INS/GNSS Integration System for Seamless Land Vehicle Mapping in GNSS-Denied Environment
Guang-Je Tsai, Kai-Wei Chiang and Naser El-Sheimy

187 The Performance Analysis for Artificial Neural Network aided localization with Image Recognition Technologies in Smartphone Platform
Shih-Huan Huang, Yu-Hua Li and Kai-Wei Chiang

202 Positioning System for Subway Lines and Stations Using Cellular Tower IDs
Go Matsubara, Hiroshi Kanasugi, Jun Kumagai and Ryosuke Shibasaki

204 Directional Presumption for Pedestrian Navigation System using UHF RFID
Yasutaka Kishimoto and Takeshi Kawamura

205 Room-level indoor positioning based on acoustic impulse response identification
Leticia Jaen Tapia, Fernando J. Álvarez Franco, Teodoro Aguilera Benítez and Juan Jesus Garcia

206 Fusion of Ibeacon and Inertial Measurements for high accuracy indoor positioning
Feng GAO and Yanghuan LI

207 Accurate RSSI-Based Indoor Localization Using Time-Domain Path Loss Compensation
Ryo Saito, Koichi Ichige, Takashi Ishihara and Akira Nakazawa

208 Development of RFID-based Localization System for AGV(Automatic Guided Vehicle) Control and Navigation
Jinhong Kim, Youngjae Lee and Kiyoung Moon

209 Smartphone Inertial Sensor-based Indoor Localization using Acoustic Signal
Hiroaki Murakami, Hiromichi Hashizume and Masanori Sugimoto

210 Error Modeling of Reduced IMU using Recurrent Neural Network
Siavash Hosseinyalamdary and Yashar Balazadegan Sarvrood

212 Doppler effect analysis on Zadoff-Chu and Kasami sequences for an ultrasonic LPS
Santiago Emmanuel F. Murano, Maria del Carmen Perez, David Gualda, Jose Manuel Villadangos, Jesús Ureña Ureña, Carlos De Marziani and Alvaro Hernandez

213 UWB-based Real-Time Cooperative Localization System
Anojh kumaran Rajendra, Yang Song, Karthikeyan Gururaj, Chongxiao Wang, Guofa Cai, Choi Look Law, Wee Peng Tay and Hwei Ping Chow

215 NAVIN – A Modular Indoor Navigation Platform for a Wide Range of Applications
Peter Tatai, Tamas Rittling and Rajmund Bocsi

216 Accurate Distance Tracking using WiFi
Martin Schüssel

217 Tracking of wheelchair users in dense crowds
Jette Schumann and Maik Boltes

218 Multi-sensor Indoor Target Localization Based on Multipath Exploitation
Nobuya Arakawa and Koichi Ichige

220 Performance of Zero Displacement Update in Stair Walking : A Comparison Study
Akira Sawatome, Mitsunori Tada and Hiroshi Takemura

221 Fundamental Study on Inducing Human Behavior for Congestion Prevention in Large Commercial Facilities and Public Spaces
Nobuo Sato and Akinori Asahara

222 VLC positioning-error reduction during robot operation
Shohei Noda, Yohei Nakazawa, Kentaro Nishimori and Hideo Makino

223 Development of Real Time 3D Positioning System for Indoor Entertainment Ballon Robots
Hiroya Nagata

224 WiFi-Fingerprinting based Indoor Localization Through Machine Learning
Arjun Arjun, Rahul Malavalli and Nilesh Gupta

225 An Ultrasound-based Indoor Localization Using Gaussian ASK Modulation
Jinse Kwon, jemin lee and hyungshin kim

227 Development of Transmitter Made with Microcomputer for Indoor Positioning System Using Spread Spectrum Ultrasonic Waves
Nobuyuki Hosokawa

228 AmbiLoc: A year-long dataset of FM, TV and GSM fingerprints for ambient indoor localization
Andrei Popleteev

229 A frequency down converter to utilize smartphones for indoor positioning systems using spread spectrum ultrasonic waves
Taketoshi Iyota

230 Analysis of performance of Ultrasonic Local Positioning Systems for 3D Spaces
Khaoula Mannay, Jesús Ureña Ureña, Alvaro Hernandez, David Gualda and Jose Manuel Villadangos

231 Development of IR Marker Positioning System
Noriyuki SAKAI, Keiichi ZEMPO, Takeshi Kurata, Tadashi Ebihara, Koichi Mizutani, Naoto Wakatsuki and Ryosuke Ichikari

163 Pseudolite seamless indoor and outdoor positioning is developing rapidly in China
Baoguo Yu, yaning Li, Xingli Gan, Ruihui Zhu and Heng Zhang

164 Indoor Positioning Technology of Beidou/GPS Pseudolites Correction PDR
Gan Xingli

188 Detecting and Indexing Conversational Groups Based on Auditory Similarity
Kai Toyama and Yasuyuki Sumi

203 The Generation of Well Geo-referenced Floor Plans with Inertial Sensors Aided SLAM Algorithm
Min-Chuan Tsai, Guang-Je Tsai and Kai-Wei Chiang

219 Optical Fiber Interferometric Sensor For Indoor Positioning
Ravikumar Jain and Priyanka Yadav

Afternoon Group Photo: Time and Location will be announced at the registration desk.

19:00 – Gala Dinner. Keio Plaza Hotel Sapporo
(https://www.keioplaza-sapporo.co.jp/english/access/)
(Award for Best Paper, Poster and Competition)

THURSDAY, 21 SEPTEMBER

08:20 –13:00 Registration: Hall/Foyer
09:00 –17:40 Exhibition. Hall/Foyer
09:00 –11:00 Parallel Sessions

SS-7(Special Session) Competition (continues to 13:15). Auditorium

Competition Chairpersons : Francesco Potortì, Nobuo Kawaguchi, Sangjoon Park

- Track 1 - Smartphone-based

Chairpersons : Filippo Palumbo, Antonino Crivello

Team 1	Pedestrian Dead Reckoning-based Indoor Navigation using a Routing Graph extracted from Floor Plans ***Larissa Zech, Niels Groth, Simon Schmitt, Katinka Wolter, Freie Universität Berlin, AG Computer Systems & TelematicsBerlin, Germany***
Team 2	System for Carers to Track Elderly People in Visits to a Crowded Shopping Mall ***Ravindra Ranasinghe, Gamini Dissanayake, Asok Perera, Centre of Autonomous Systems at University of Technology, Sydney, Australia***
Team 3	TBC ***Hee-dong Son, Muhammad Usman Ail, Mingyu Kang, Yeongrae Jo, Chanseok Lee, Seunggu Jeong, Yeungnam University, Korea***

Team 4 Pedestrian Dead Reckoning Based Indoor Navigation Using Smartphone

Soyoung Park, Hojin Ju, Jae Hong Lee, Chan Gook Park, Seoul National University, South Korea

Team 5 An Indoor Positioning System Using Pedestrian Dead Reckoning with WiFi and Map-matching Aided

Khanh Nguyen-Huu, KyungHo Lee, Seon-Woo Lee, Department of Electronic Engineering, Hallym University, Republic of Korea

Team 6 A Smartphone Based Hand-Held Indoor Positioning System

Lingxiang Zheng, Yizhen Wang, Ao Peng, Zhenyang Wu, Dihong Wu, Biyu Tang, Hai Lu, Haibin Shi, Huiru Zheng, School of Information Science and Engineering, Xiamen University, Xiamen, China

Team 7 BeeTrack: A Real-time Indoor Tracking System

Xiong Fang, Haoxuan Ye, Dezhi Zhang, Guoping Qiu, Beemap Technology Limited, University of Nottingham & Shenzhen University, China

Team 8 Navix: Smartphone Based Hybrid Indoor Positioning

J. C. Aguilar Herrera, A. Ramos, Shirel Bolanos, Navix Indoor Navigation, Santiago de Queretaro, Mexico

Team 9 Pretty Indoor

M. Agostini, A. Crivello, F. Palumbo, F. Potortì, Istituto di Scienza e Tecnologie dell'Informazione “A. Faedo”, CNR, Italy

- Track 2 - Pedestrian Dead Reckoning

Chairpersons : Soyeon Lee

Team 1 A Foot-mounted PDR System Based On IMU/EKF+HMM+ZUPT+ZARU+HDR+Compass Algorithm

Wenchao Zhang, Xianghong Li, University of Chinese Academy of Sciences, Academy of Opto-electronics, Chinese Academy of Sciences, Beijing, China, Dongyan Wei, Xinchun Ji, Academy of Opto-electronics, Chinese Academy of Sciences, Beijing, China

Team 2 Pedestrian Dead Reckoning System using Quasi-static Magnetic Field Detection

Yu Liu, Liqiang Zhang, and Kai Guo, Tianjin University, Tianjin, China

Team 3 FootSLAM

Susanna Kaiser, Estefania Munoz Diaz, Dina Bousdar Ahmed, German Aerospace Center (DLR), Germany

Team 4 EKF-based Magneto-Inertial Dead-Reckoning Navigation System

Charles-Ivan Chesneau, Sysnav, Univ. Grenoble Alpes, Mathieu Hillion, Sysnav, Sysnav, Christophe Prieur, Univ. Grenoble Alpes, France

Team 5 Stride detection for pedestrian trajectory reconstruction: a machine learning approach based on geometric patterns

Bertrand Beaufils, Marc Grelet, Sysnav, Frédéric Chazal, Inria Saclay team DataShape, and Bertrand Michel, Centrale Nantes Informatic and Mathematics Department, France

Team 6 Research On Multiple Gait and 3D Indoor Positioning System

Lingxiang Zheng, Rongxin Wang, Dihong Wu, Ao Peng, Dihong Wu, Biyu Tang, Hai Lu, Haibin Shi, Xiamen University, China, Huiru Zheng, University of Ulster, Ireland

Team 7 A PDR System using IMU based Gait Tracking and Map Matching

Chuanhua Lu, Hideaki Uchiyama, Diego Thomas and Rin-ichiro Taniguchi, Kyushu University, Japan

Team 8 Inertial Pocket Localization: System Overview

Estefania Munoz Diaz, Dina Bousdar Ahmed and Susanna Kaiser, German Aerospace Center (DLR), Germany

Team 9 Foot-mounted PDR

Xiaoyong Luo, GLONAVIN, China

- Track 3 - Smartphone-based (off-site)

Chairpersons : Joaquín Torres, Antonio R. Jiménez

Team 1 UMinho Team (Team Name)

Adriano Moreira, António Costa, Filipe Meneses, Maria João Nicolau, Universidade do Minho & Centro de Computaçao Gráfica, Portugal

Team 2 Smartphone PDR Positioning in Large Environments Employing WiFi, Particle Filter, and Backward Optimization

Stefan Knauth, Stuttgart Technology University of Applied Sciences, Germany

Team 3 Marauder’s Map team (Team Name)

Ta Viet Cuong, Dominique Vaufreydaz, Dao Trung Kien, Eric Castelli, University of Grenoble-Alpes, Inria, France, Hanoi University of Science and Technology, Vietnam

Team 4 AraraIPS (Team Name)

Joaquín Farina, Tomás Lungenstrass, Juan Pablo Morales, AraraDS, Chile

Team 5 University of Technology Sydney Team (Team Name)

Ravindra Ranasinghe, Gamini Dissanayake and Asok Perera, Centre of Autonomous Systems at University of Technology Sydney, Australia

Team 6 YAI team (Team Name)

Wei-Chung Lu, Wen-Chen Lu, Ho-Ti Cheng, Shi-Shen Yang, Shih-Hau Fang, Ying-Ren Chien and Yu Tsao, Yuan Ze University, National Ilan University, Academia Sinica Research Center for Information Technology Innovation, Taiwan

- Track 4 - PDR for warehouse picking (off-site)

Chairpersons : Masakatsu Kourogi, Ryosuke Ichikari

Team 1 A Multi-Sensor Fusion Technique for Pedestrian Localization in a Warehouse

Youngjae Lee, Haemin Lee, Jinhong Kim, Dongyeop, Kang, Kiyoung Moon, Daegu-Gyeongbuk Research Institute, ETRI, Seong Yun Cho, Dept. of Robot Engineering, Kyeongil University, Korea

Team 2 No PDR, No future

Yoshihiro Ito, Hisashi Hoshi, KDDI R&D Laboratories Inc., Japan

Team 3 A Smartphone Based Indoor Positioning System

Lingxiang Zheng, Yizhen Wang, Ao Peng, Zhenyang Wu, Dihong Wu, Biyu Tang, Hai Lu, Haibin Shi, School of Information Science and Engineering, Xiamen University, Korea, Huiru Zheng, School of Computing and Mathematics, University of Ulster, Ireland

Team 4 Trajectory Estimation Using PDR and Simulation of Human-Like Movement

Kotaro Hananouchi, Junto Nozaki, Kenta Urano, Graduate School of Engineering, Nagoya University, Kei Hiroi, Nobuo Kawaguchi, Institutes of Innovation for Future Society, Nagoya University, Japan

Team 5 Moving Trajectory Estimation Based on Sensors

Ho-Ti Cheng, Wen-Chen Lu, Chia-Min Lin, Yu-Shen Lai, Yun-Yeh, Huan-Wei Liu, Shih-Hau Fang, Department of Electrical Engineering / Innovation Center for Big Data and Digital Convergence, Yuan Ze University, Ying-Ren Chien, Department of Electrical Engineering, National Ilan University, Yu Tsao, Research Center for Information Technology Innovation , Academia Sinica, Taiwan

A-7. Magnetic. Room-A

Chairperson : TBD

83 3D Magnetic Field Mapping in Large-Scale Indoor Environment Using Measurement Robot and Gaussian Processes

Naoki Akai and Koichi Ozaki

100 Improving magneto-inertial attitude and position estimation by means of a magnetic heading observer

Charles-Ivan CHESNEAU, Mathieu Hillion and Christophe Prieur

134 Magnetic Indoor Positioning System Using Deep Neural Network
Namkyoung Lee and Dongsoo Han

135 An Inverse Square root Filter for Robust Indoor/Outdoor Magneto-visual-inertial Odometry
David Caruso, Alexandre Eudes, Martial Sanfourche, David Vissière and Guy le Besnerais

145 TuRF: Fast Data Collection for Fingerprint-based Indoor Localization
Chenhe Li, Qiang Xu, Zhe Gong and Zheng Rong

B-7. Optical/Computer Vision. Room-B

Chairperson : TBD

10 Influence of the Aperture-Based Receiver Orientation on RSS-Based VLP Performance
Jose Miguel Menendez and Heidi Steendam

27 Six-Degrees of Freedom Pose Estimation Using Dual-Axis Rotating Laser Sweeps Using a Probabilistic Framework
Dennis Laurijssen, Steven Truijen, Wim Saeys, Walter Daems and Jan Steckel

48 On Assessing the Positioning Accuracy of Google Tango in Challenging Indoor Environments
Khuong Nguyen and Zhiyuan Luo

76 Monocular-based Pose Estimation Using Vanishing Points for Indoor Image Correction
Paul Verlaine Gakne and Kyle O'Keefe

121 High-performance Indoor Positioning and Pose Estimation with Time-of-Flight 3D Imaging
Hannes Plank, Theresa Egger, Christoph Steffan, Christian Steger and Norbert Druml

11:00 –11:15 Coffee Break. Hall/Foyer

11:15 –13:15 Parallel Sessions

SS-7(Special Session): Competition. Auditorium (continues from 9:00) . Auditorium

A-8. Mapping. Room-A

Chairperson : TBD

12 Grammar-based Map Parsing for View Invariant Map Descriptor
Enfu Liu, kanji tanaka and Xiaoxiao Fei

16 A Robotic Fingerprinting Method for Automatic Calibration of UltraWide Band Tracking Systems: A Person Localization Case-study
Alessio Canepa, Zeynab Talebpour and Alcherio Martinoli

108 Fast Routing Graph Extraction from Floor Plans
Simon Schmitt, Katinka Wolter, Thomas Willemsen, Harald Sternberg and Marcel Kyas

131 Points of Interest Detection for Map-Aided PDR in Combined Outdoor-Indoor spaces
Fadoua Taia Alaoui, Valérie Renaudin and David Betaille

144 Analysis of Floor Map Image in Information Board for Indoor Navigation
Tomoya Honto, Yoshihiro Sugaya, Tomo Miyazaki and Shinichiro Omachi

B-8. App/Context 2. Room-B
Chairperson : TBD

7 Navigational needs and requirements of hospital staff: Geneva University Hospitals case study
Grigorios G. Anagnostopoulos, Michel Deriaz, Jean-Michel Gaspoz, Dimitri Konstantas and Idris Guessous

8 Co-location Epidemic Tracking on London Public Transports Using Low Power Mobile Magnetometer
Khuong Nguyen, Chris Watkins and Zhiyuan Luo

52 Localization System for Carers to Track Elderly People in Visits to a Crowded Shopping Mall
Asok Perera, Janindu Arukgoda, Ravindra Ranasinghe and Gamini Dissanayake

79 Stable Six-DoF Head-Pose Tracking in Assistive Technology Application
Edwin Peter Walsh, Walter Daems and Jan Steckel

13:15 –13:30 Closing Ceremony & IPIN2018 Presentation. Auditorium
Chairperson : Masanori Sugimoto

13:30 –14:10 Lunch on your own

14:30 –17:30 Workshop. Room-A
IPIN2017 Summaries (in Japanese)

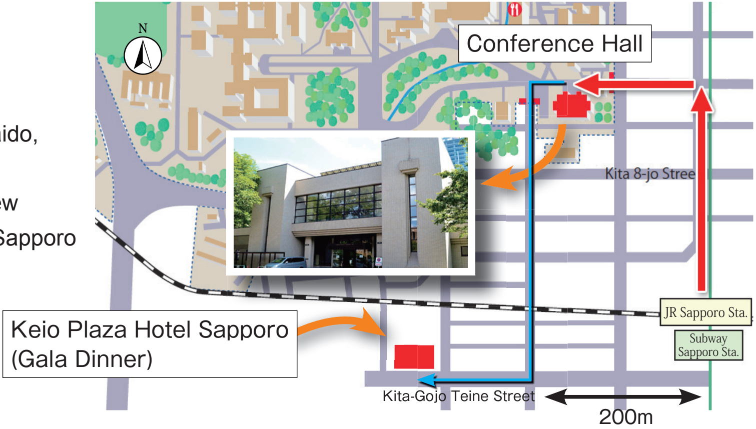
GENERAL INFORMATION

A. CONFERENCE VENUE

Conference Hall Hokkaido University, Sapporo, Japan

Kita 8, Nishi 5, Kita-ku, Sapporo, Hokkaido,
Japan

The Hokkaido University campus is a few blocks north (10 minute walk) from JR Sapporo Station.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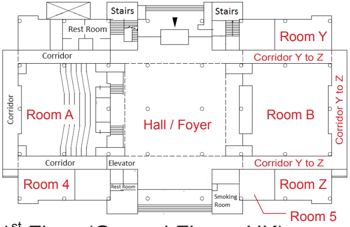
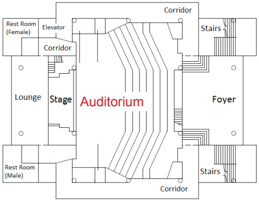
Conference Hall
Kita 8-jo Stree
JR Sapporo Sta.
Subway Sapporo Sta.
Keio Plaza Hotel Sapporo (Gala Dinner)
Kita-Gojo Teine Street
200m


Stairs
Stairs
Rest Room
Room Y
Corridor
Corridor Y to Z
Corridor
Room A
Hall / Foyer
Room B
Corridor Y to Z
Corridor
Elevator
Corridor Y to Z
Room 4
Rest Room
Smoking Room
Room Z
Room 5

1st Floor (Ground Floor : UK)


Corridor
Rest Room (Female)
Elevator
Stairs
Corridor
Lounge
Stage
Auditorium
Foyer
Rest Room (Male)
Stairs
Corridor

2nd Floor (1st Floor : UK)

B. REGISTRATION

The Registration Desk is located at the Hall/Foyer on the first floor (the ground floor : UK) of the Conference Hall.

The Conference Proceedings is available to download from the IPIN2017 website or a USB flash drive at the Registration Desk.

Opening hours:

Monday, 18 September : 9:00 – 12:00, 13:00 – 18:00 h
Tuesday, 19 September : 8:20 – 12:00, 13:00 – 18:00 h
Wednesday, 20 September : 8:20 – 12:00, 13:00 – 18:00 h
Thursday, 21 September : 8:20 – 13:00 h

C. PRESENTATIONS

Oral Presentation

Each oral presentation will have 23 minutes which include 4-5 minutes for questions. We recommend you prepare your slides for a duration of about 18 minutes. Each presentation room will be equipped with a video projector with a VGA connector and a Windows laptop with PowerPoint and Adobe Acrobat Reader.
You may use your own laptop. If you use the conference laptop, please confirm that all fonts are embedded in your presentation files, and you should load your presentation into the conference laptop during the break preceding your presentation session.

Presentations on competition will be aligned in the special session on Competition, September 21th. Time duration for presentation will be decided soon by Competition Chairs and Track Chairs.

Poster Presentation

For regular and Work-in-Progress papers accepted as poster presentation, authors should prepare a poster the size of which is within A0 portrait (max. size of w: 84.1cm x h: 118.9cm) to be hung in the posters' area to answer the attendees questions during the corresponding sessions defined in the conference program.

D. LUNCHES, COFFEE BREAKS, RECEPTION AND GALA DINNER

Lunches will be provided free of charge for registered attendees at the Hall/Foyer on Tuesday, September 19th and Wednesday, September 20th.

Drinks and snacks will be served in **coffee breaks** from Tuesday, September 18th to Thursday, September 21st following the conference program timetable.

Welcome **reception** for registered attendees will be held at 18:00 on Tuesday, September 18th at the Hall/Foyer.

Gala dinner will start from 19:00 on Wednesday September 20th, at Keio Plaza Hotel Sapporo (Please see page 44) , 10 minute walk from the conference venue. A limited number of extra tickets (10,000 JPY per person) for non-registered attendees will be available at the registration desk.

Please note that no food is allowed in the conference venue except Room B and Hall/Foyer during lunch time and coffee breaks.

E. CULTURAL PROGRAM

Sado (Japanese Tea Ceremony)

Learn the history behind sado, or the way of tea, and join a ceremony dedicated to the making and drinking of Zen-influenced drink. Fell free to come by yourself, with your family or friends.

13:00 - 14:30, Tuesday, 19 September at Hall/Foyer

(No reservation needed)

F. INTERNET ACCESS

Free internet access will be available in the conference venue.

Registered attendees will be provided their own account, which will be printed on the reverse side of their name tag. The SSID name is "eduroam".

G. EXHIBITION

15 companies in the indoor location business domain from all over the world will be presenting their latest solutions and products at the exhibition.

Company : Name	
AISAN TECHNOLOGY Co.,Ltd.	http://www.aisantec.co.jp/english/
Aquacosmos Ltd.	http://www.iwane.com/eng/index.html
Iwane Laboratories, Ltd.	http://www.iwane.com/eng/index.html
Esri Japan Corporation	https://www.esri.com/en-us/home
Koozyt, Inc.	http://www.koozyt.com/?lang=en
KOZO KEIKAKU ENGINEERING Inc.	http://www.kke.co.jp/en/solution/theme/navvis.html
Kokusai Kogyo Co., Ltd.	http://www.kkc.co.jp/english/index.html
Computer Engineering & Consulting, Ltd.	http://www.cec-ltd.co.jp/en/
ZENRIN DataCom CO., LTD.	http://www.zenrin-datacom.net/en/index.html
Philips Lighting Holding B.V.	http://www.lighting.philips.com/main/systems/themes/led-based-indoor-positioning
PDR Benchmark Standardization Committee	https://www.facebook.com/pdr.bms/
MULTISOUP CO., LTD.	http://www.multisoup.co.jp/en/
U'sFactory	http://us-factory.jp/
Ubisense Inc.	https://ubisense.net/en
Location Information Service Research Agency	http://lisra.jp/en/

13 : 00 - 18 : 25, Wednesday, 20 September at Hall/Foyer
9 : 00 - 17 : 40, Thursday, 21 September at Hall/Foyer

IPIN 2017
Eighth International Conference on
INDOOR POSITIONING AND INDOOR NAVIGATION
September 18-21, 2017, Sapporo, Japan

IPIN 2017 SAPPORO

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