6th IFAC Symposium on Intelligent Autonomous Vehicles IAV 2007, Toulouse, France

Preliminary Program

Monday September 3th

8:50-9:05 Welcome and opening session

9:10-11:00 Sessions 1A, 1B and 1C

Session 1A⊡Robot control 1

 # ON TAXIS FOR CONTROL AND ITS QUALITATIVE SOLUTION ON MOBILE ROBOTS
Inaki Rano
 # A PROPOSAL FOR PARAMETER TUNING IN FRACTIONAL MRAC. APPLICATION TO THE LATERAL CONTROL OF AN AUTONOMOUS VEHICLE
José Ignacio Suárez, Blas M. Vinagre
 # MOTION PLANNING AND OPTIMAL CONTROL OF AN AUTONOMOUS VTOL AIRCRAFT
Amit Ailon
 # NON-SINGULAR PATH-FOLLOWING, CONTROL OF WHEELED ROBOTS WITH VELOCITY ACTUATOR SATURATIONS
Lionel Lapierre, Giovanni Indiveri

Session 1B⊡Motion planning

 # RRT-D: A MOTION PLANNING APPROACH FOR AUTONOMUS VEHICLES BASED ON WIRELESS SENSOR NETWORK INFORMATION
Fernando Gomez-Bravo, Diego Lopez, Federico Cuesta, Anibal Ollero
 # A GOAL-DIRECTED REACTIVE OBSTACLE AVOIDANCE STRATEGY WITH GLOBAL PROOFS
Javier Antich, Alberto Ortiz
 # LEARNING TO COORDINATE IN TOPOLOGICAL NAVIGATION TASKS
Francisco S. Melo, Isabel Ribeiro
 # COOPERATIVE ROUTE SEARCHING SYSTEM WITH DYNAMICS OF TRAFFIC FLOW
Keita Tsutsumi, Takahiro Yako

Session 1C: Underwater robotics, Sensing

 # PROBABILISTIC FILTERING OF SONAR DATA
Antoni Burguera, Yolanda González, Gabriel Oliver
 # INTERFERENCE MODELIZATION IN MULTI-ROBOT AUCTION METHODS
José Guerrero, Gabriel Oliver
#A METHOD FOR EXTRACTING LINES AND THEIR UNCERTAINTY FROM ACOUSTIC UNDERWATER IMAGES FOR SLAM
David Ribas, Pere Ridao, José Neira, Juan Domingo Tardós
 # SENSOR FAULT DIAGNOSIS OF AUTONOMOUS UNDERWATER VEHICLE
Daqi Zhu

11:00 Coffee break

11:30 Invited Conference 1:
Operationnal AUVs for oceanography, and new concepts of autonomous hybrid systems for the offshore applications
Vincent Rigaud (IFREMER, France)

12:30 *Lunch*

14:00 Sessions 2A, 2B, 2C

Session 2A Underwater robotics, Control

 # OBJECTIVE DIRECTED CONTROL USING LOCAL MINIMISATION FOR AN AUTONOMOUS UNDERWATER VEHICLE
Lars Alminde, Jan Dimon Bendtsen, Jakob Stoustrup, Kristin Pettersen
 # FAST PROTOTYPING OF AN AUTONOMOUS UNDERWATER VEHICLE WITH THE CUBESYSTEM
Diana Albu, Andras Birk, Petar Dobrev, Farah Gammoh, Andrei Giurgiu, Sergiu-Cristian Mihut, Bogdan Minzu, Razvan Pascanu, Sören Schwertfeger, Alexandru Stan, Stefan Videv
 # COORDINATED PATH-FOLLOWING OF MULTIPLES SURFACE VESSELS WITH PARAMETRIC MODEL UNCERTAINTY AND IN THE PRESENCE OF OCEAN CURRENTS
João Almeida, Carlos Silvestre, António Pascoal
 # A KINEMATIC VIRTUAL POTENTIALS TRAJECTORY PLANNER FOR AUV-S
Matko Barisic, Zoran Vukic, Nikola Miskovic

Session 2B: Applications , Case studies (1)

 # ANSER: AIRPORT NIGHT SURVEILLANCE EXPERT ROBOT
Francesco Capezio, Fulvio Mastrogiovanni, Antonio Sgorbissa, Renato Zaccaria
 # DETERMINISTIC PATH PLANNING AND NAVIGATION FOR AN AUTONOMOUS FORK LIFT TRUCK
Matthias Hentschel, Daniel Lecking, Bernardo Wagner
 # RIOL - ROBOTIC INSPECTION OVER POWER LINES
João Sequeira, Luís Tavares
 # APPLICATION OF NEURAL NETWORKS BASED ANARX STRUCTURE TO BACKING UP CONTROL OF A TRUCK-TRAILER
Juri Belikov, Eduard Petlenkov, Sven Nõmm

Session 2C: Localization

 # FAST VISION-BASED LOCALIZATION FOR OUTDOOR ROBOTS USING A COMBINATION OF GLOBAL IMAGE FEATURES
Christian Weiss, Andreas Masselli, Andreas Zell
 # AN EFFICIENT ALGORITHM FOR GLOBAL LOCALIZATION BY SEARCHING A BIT-ENCODED GRAPH
Pablo San Segundo, Diego Rodríguez-Losada, Ramón Galán, Fernando Matía, Agustín Jiménez
 # AN INTEGRATED FRAMEWORK FOR SIMULTANEOUS ROBOT AND SENSOR NETWORK LOCALIZATION
Andrea Gasparri, ***STEFANO*** Panzieri, Federica Pascucci, Giovanni Ulivi
 # CONSENSUS FILTER FOR SENSOR NETWORKS LOCALISATION AND TRACKING
David Perillo, Maurizio Di Rocco, Federica Pascucci

15:50 ***Coffee break***

16:15 **Sessions 3A, 3B, 3C**

Session 3A: Early Vision

 # COMPARING SEVERAL IMPLEMENTATIONS OF TWO RECENTLY PUBLISHED FEATURE DETECTORS
Johannes Bauer, Niko Sünderhauf, Peter Protzel
 # CHARACTERIZATION OF FEATURE DETECTION ALGORITHMS FOR A RELIABLE VEHICLE LOCALIZATION
Tessier Cédric, Berducat Michel, Chapuis Roland, Bonnet Sébastien
 # SMART CAMERA WITH EMBEDDED TRACKING ALGORITHM
Fabio Dias, François Berry, François Marmoiton, Jocelyn Sérot
 # REAL-TIME STEREOVISION BY AN INTEGRATED SENSOR
JL.Boizard, M.Devy, P.Lacroix , P.Fillatreau, J.Y.Fourniols, T.Sentenac

Session 3B: Applications, Case studies (2)

 # FOREST FIRE DETECTION WITH A SMALL FIXED WING AUTONOMOUS AERIAL VEHICLE
Alfredo Martins, José Miguel, Andre Figueiredo, Filipe Santos, Domingos Bento, Hugo Silva, Eduardo Silva
 # AUTONOMOUS HAZARD AVOIDANCE FOR PLANETARY LANDERS
Yannick Devouassoux, Marc Drieux, Stéphane Reynaud, Eugénio Ferreira, Grégory Gelly, Adrien Muller
 # ADVANCED ROBOTICS TECHNOLOGY INFUSION TO THE NASA MARS EXPLORATION ROVER (MER) PROJECT
Samad Hayati, Arturo Rankin, Won Kim, Patrick Leger, Rebecca Castano, and Khaled Ali
 # AUTONOMOUS EXPLORATION BEHAVIOR PLANNING FOR PLANETARY ROVER
Takashi Kubota, Riho Ejiri, Ichiro Nakatani

Session 3C: Perception for aerial robots

 # UAV ATTITUDE ESTIMATION BY COMBINING HORIZON-BASED AND HOMOGRAPHY-BASED APPROACHES FOR CATADIOPTRIC IMAGES
Jean-Charles Bazin, InSo Kweon, Cedric Demonceaux, Pascal Vaseur
 # AN EXPERIMENTAL STUDY OF AERIAL STEREO VISUAL ODOMETRY
Jonathan Kelly, Gaurav Sukhatme

 # STEREO VISUAL SYSTEM FOR AUTONOMOUS AIR VEHICLE NAVIGATION
Luis Mejias, Pascual Campoy, Ivan Mondragón, Patrick Doherty
 # FUSION OF OPTICAL FLOW AND INERTIAL SENSORS FOR FOUR-ROTOR ROTORCRAFT STABILIZATION
Hugo Romero, Sergio *SALAZAR*, Rogelio Lozano, Ryad Benosman

18□15 Welcome cocktail in the conference center

Tuesday September 4th

8□55 Sessions 4A, 4B, 4C

Session 4A□Aerial robotics□Control

 # MODELING AND DEVELOPMENT OF A 4 ROTORS HELICOPTER UAV
Naoufel Azouz, Khadidja Benzemrane, Gilney Damm, Gilbert Pradel
 # SLIDING MODE CONTROL FOR THE PATH FOLLOWING OF AN UNMANNED AIRSHIP
Ely de Paiva, Fabio Benjovengo, Samuel Bueno
 # LINEAR AND NONLINEAR CONTROL STRATEGIES TO STABILIZE A VTOL AIRCRAFT: COMPARATIVE ANALYSIS
Guillaume Sanahuja, Pedro Castillo, Octavio Garcia, Rogelio Lozano
 # EXPERIMENTAL RESULTS ON COMMAND AND CONTROL OF UNMANNED AIR VEHICLE SYSTEMS
Pedro Almeida, Ricardo Bencatel, Gil Gonçalves, João Sousa, Christoph Ruetz
 # MODELLING AND STABILIZING CONTROL LAWS DESIGN BASED ON BACKSTEPPING FOR AN UAV TYPE-QUADROTOR
Hakim Bouadi, Mouloud Bouchoucha, Mohamed Tadjine

Session 4B□Aerial robotics□Decision

 # RESSAC: UAV EXPLORING, DECIDING AND LANDING IN A PARTIALLY KNOWN ENVIRONMENT
Patrick Fabiani, Vincent Fuertes, Guy Le Besnerais, Alain Piquereau, Roger Mampey, Florent Teichteil
 # DYNAMIC PROBLEM GENERATION IN A UAV DOMAIN
Per Nyblom
 # PROBABILISTIC ROADMAPS AND ANT COLONY OPTIMIZATION FOR UAV MISSION PLANNING
Florian *ADOLF*, Augusto Langer, Lucas de Melo Pontes e Silva, Frank Thielecke
 # REENGINEERING THE PAPARAZZI AUTOPILOT NAVIGATION SYSTEM
Pascal Brisset, Antoine Drouin, Yannick Jestin
 # DESIGN AND TEST OF AN AUTONOMOUS HELICOPTER FOR MULTI-VEHICLE COOPERATION
Christian Herrmann, Florian Zeiger, Lei Ma, Christian Selbach, Klaus Schilling

Session 4C: Visual navigation

 # VEHICLE LOCALIZATION IN URBAN CANYONS USING GEO-REFERENCED DATA AND FEW GNSS SATELLITES. FIRST EXPERIMENTAL RESULTS.
Clément Fouque, Philippe Bonnifait
 # EXPERIMENTAL EVALUATION OF AN URBAN VISUAL PATH FOLLOWING FRAMEWORK
Albert Diosi, Anthony Remazeilles, Sinisa Segvic, Francois Chaumette
 # A FRAMEWORK FOR VEHICLE PLATOONING BASED ON MONOCULAR VISION
Eric Royer, ***Maxime*** Lhuillier, Michel Dhome, François Marmoiton
 # SPEED-RANGE DILEMMAS FOR VISION-BASED NAVIGATION IN UNSTRUCTURED TERRAIN
Pierre Sermanet, Raia Hadsell, Ayse Erkan, Jan Ben, Beat Flepp, Urs Muller, Yann LeCun
 # EXPLOITING INERTIAL SENSING IN MOSAICING AND VISUAL NAVIGATION
Luiz Mirisola, Jorge Dias

11:00 Coffee break

11:30 Invited Conference 2:
Aerial robotics, from airborne SLAM and control to cooperative UAVs.
Salah Sukkarieh (ACFR, Australia)

12:30 ***Lunch***

14:00 Invited Conference 3:
Advanced Driver Assistance Systems, an Approach to enhance Comfort and Safety
Michael Luetz (Siemens VDO, Germany)

15:05 Sessions 5A, 5B, 5C

Session 5A: Service robotics for outdoor environments

 # COLOR TEXTURE ANALYSIS APPLIED TO MINE DETECTION
Nathalia Garcia-Paredes, Gabriel Avina-Cervantes, Carlos Parra, Michel Devy
 # GIM, TOWARDS THE FUTURE WORKSITE
Jussi Suomela, Jari Saarinen, Aarne Halme, Matti Vilenius, Kalevi Huhtala

Session 5B: ITS, Vision 1

 # VISION GUIDED BY VEHICLE DYNAMICS FOR ONBOARD ESTIMATION OF THE VISIBILITY RANGE
Clément Boussard, Nicolas Hautière, Brigitte d'Andréa-Novel
 # LONG DISTANCE VISION SENSOR FOR DRIVER ASSISTANCE
Luc Duvieubourg, François Cabestaing, Sébastien Ambellouis, Pierre Bonnet

Session 5C: ITS, Driver Assistance

 # DRIVING ASSISTANCE FOR PARAPLEGIC PEOPLE « BRAKE ON HANDWHEEL COUPLED TO THE STEERING-BY-WIRE SYSTEM »
Kamel MESSAOUDENE, Naima Ait Oufroukh, Said Mammar

 # SMART ONE-HAND OPERATION MECHANISM FOR MULTI-PURPOSE STEERING OF A FOUR-WHEELED VEHICLE WITH HIGH PERFORMANCE
Tokuji OKADA, Toshinori IMURA, Toshimi Shimizu

15:55 *Coffee break*

16:25 **Sessions 6A, 6B, 6C**

Session 6A: Service robotics for indoor environments

 # AUTONOMOUS OPENING OF A DOOR WITH A MOBILE MANIPULATOR: A CASE STUDY
Christian Ott, Berthold Bäuml, Christoph Borst, Gerd Hirzinger
 # USING A 3D TIME-OF-FLIGHT RANGE CAMERA FOR VISUAL TRACKING
Ulrich Reiser, Jens KUBACKI
 # IMPLEMENTATION OF HUMAN PERCEPTION ALGORITHMS ON A MOBILE ROBOT
Mathias Fontmarty, Thierry Germa, Brice Burger, Luis-Felipe Marin, Steffen Knoop

Session 6B: ITS, Vision 2

 # ADAPTIVE BAYESIAN COMBINATION OF FEATURES FROM LASER SCANNER AND CAMERA FOR PEDESTRIAN DETECTION
Laurence NGAKO PANGOP, Frederic CHAUSSE, Sebastien CORNOU, Roland CHAPUIS
 # CONTRIBUTION OF COLOR TO STEREOSCOPIC STEPS FOR ROAD-OBSTACLE DETECTION
Iyadh Cabani, Gwenaëlle Toulminet, Abdelaziz Bensrhair
 # COLLISION AVOIDANCE FOR COGNITIVE AUTOMOBILES USING A 3D PMD CAMERA
Stefan Vacek, Thomas Schamm, Joachim Schroeder, Ruediger Dillmann

Session 6C: ITS, Control

 # A REAL-TIME SAFTE NAVIGATION ARCHITECTURE FOR AUTOMATED VEHICLES IN URBAN ENVIRONMENTS
Gang Chen, Thierry Fraichard
 # EXPERIMENTAL EVALUATION OF AN OBSERVER FOR LATERAL TIRE FORCES AND VEHICLE SIDESLIP ANGLE
Guillaume Baffet, Ali Charara, Daniel Lechner
 # DESIGN OF AN ON-DEMAND ALL WHEEL DRIVE CONTROL SYSTEM FOR IMPROVED AUTONOMOUS NAVIGATION
Yifeng Lin, Sohel Anwar

17:40 **End of the conference and free time**

19:30 **Gala downtown: "Hôtel Dieu Saint-Jacques"**

Wednesday September 5th

8h55 Sessions 7A,7B, 7C

Session 7A⊡Decisional level

 # AN APPROACH FOR BEHAVIOR SELECTION IN AN AUTONOMOUS VEHICLE
Daniel Jagszent, Joachim Schröder, Rüdiger Dillmann
 # A FRAMEWORK FOR SIMULTANEOUS PLAN EXECUTION AND ADAPTATION
Sylvain Joyeux, Rachid Alami, Simon Lacroix
 # ROBOT SKILL ABSTRACTION FOR A AD ARCHITECTURE
Rafael Rivas, Ana Corrales, Ramon Barber, Miguel Angel Salichs
 # A METHODOLOGY FOR ASSESSING ROBOT AUTONOMOUS FUNCTIONALITIES
Marc Lambert, Robin Jaulmes, Aurélien Godin, Eric Moliné, Delphine Dufourd
 # MERMAID - MULTIPLE-ROBOT MIDDLEWARE FOR INTELLIGENT DECISION-MAKING
Nelson Ramos, Marco Barbosa, Pedro Lima

Session 7B⊡Multi-robot

 # ENHANCED MOTION PLANNING FOR DYNAMIC FORMATIONS OF NONHOLONOMIC MOBILE ROBOTS
Martin Hess, Martin Saska, Klaus Schilling
 # NON-HOLONOMIC ROBOT FORMATIONS WITH OBSTACLE COMPLIANT GEOMETRY
Pedro Fazenda, Pedro Lima
 # DECENTRALIZED STABILIZATION STRATEGY FOR CAR-LIKE ROBOT FORMATIONS
Arturo Gil-Pinto, Philippe Fraisse, Rene Zapata, Pierre Dauchez
 # AUTONOMOUS CONFIGURATION CONTROL FOR UAV FORMATION FLIGHT IN HOSTILE ENVIRONMENTS
Gautier Hattenberger, Rachid Alami, Simon Lacroix
 # DECENTRALIZED FORMATION CONTROL USING ARTIFICIAL POTENTIALS AND VIRTUAL LEADERS
Veysel Ozdemir, Hakan Temeltas

Session 7C⊡SLAM 1

 # ASSESSING MAP QUALITY AND ERROR CAUSATION USING MARKOV RANDOM FIELDS
Manjari Chandran, Paul Newman
 # A QUANTISED STATE SYSTEMS APPROACH FOR JACOBIAN FREE EXTENDED KALMAN FILTERING
Lars Alminde, Jan Dimon Bendtsen, Jakob Stoustrup
 # FAST RANGE IMAGE SEGMENTATION FOR INDOOR 3D-SLAM
Ahad Harati, Stefan Gachter, Roland Siegwart
 # IMPACT OF PERTURBATION ESTIMATOR ON EKF-SLAM RESULTS
Chanier François, Checchin Paul, Blanc Christophe, Trassoudaine Laurent
 # FASTSLAM USING SURF FEATURES: AN EFFICIENT IMPLEMENTATION AND PRACTICAL EXPERIENCES
Peer Neubert, Niko Sünderhauf, Peter Protzel

11⊡00 Coffee break

11:30 **Invited Conference 4:**
Overview of NASA Mars Missions and Enabling Technologies
Samad Hayati (JPL,NASA, USA)

12:30 ***Lunch***

14:00 **Sessions 8A, 8B, 8C**

Session 8A: Robot control 2

 # COMPARISON OF KALMAN-TYPE ALGORITHMS IN NONLINEAR NAVIGATION PROBLEMS FOR AUTONOMOUS VEHICLES
Oleg Stepanov, Oleg Amosov, Anton Toropov
 # MOTION PLANNING AND OPTIMAL CONTROL IN A KINEMATIC MODEL OF AN AUTOMOBILE
Amit Ailon
 # SIDESLIP ANGLE MEASUREMENT. EXPERIMENTAL CHARACTERIZATION AND EVALUATION OF THREE DIFFERENT PRINCIPLES
J.Caroux, C.Lamy, M.Basset, GL.Gissinger
 # TARGET TRACKING BY NONHOLONOMIC MOBILE ROBOT
Noureddine OUADAH, Farès BOUDJEMA, Mustapha HAMERLAIN

Session 8B: Visual Recognition

 # DOOR HANDLE IDENTIFICATION: A THREE-STAGE APPROACH
Ekaitz Jauregi, José María Martínez-Otzeta, Basilio Sierra, Elena Lazkano
 # THE VISIBILITY MAP, A CONSTRAINT FOR AN ACTIVE VISUAL SEARCH BY A HUMANOID ROBOT
Francois Saidi, Olivier Stasse, Kazuhito Yokoi
 # ROBUST PLACE RECOGNITION WITHIN MULTI-SENSOR VIEW SEQUENCES USING BERNOULLI MIXTURE MODELS
Filipe Ferreira, Jorge Dias, Vitor Santos
 # HIERARCHICAL BAYESIAN CLASSIFIER BASED ON RBF-NN APPLIED FOR THE ENVIRONMENT RECOGNITION OF A MOBILE ROBOT
Fatiha hendel, Nasr eddine Berrached

Session 8C: SLAM 2

 # DUAL OF THE FACTORED SOLUTION TO THE SIMULTANEOUS LOCALIZATION AND MAPPING PROBLEM
Diego Rodriguez-Losada, Pablo San Segundo, Fernando Matia, Ramon Galan, Agustin Jimenez
 # OUTDOOR VISION-BASED DELAYED-STATE ROBOT MAPPING
Viorela Ila, Juan Andrade-Cetto, Alberto Sanfeliu
 # COOPERATIVE EXPLORATION FOR USAR ROBOTS WITH INDIRECT COMMUNICATION
Vittorio Amos Ziparo, Alexander Kleiner, Luca Marchetti, Alessandro Farinelli, Daniele Nardi
 # GUIDING AND LOCALISING IN REAL-TIME A MOBILE ROBOT WITH A MONOCULAR CAMERA IN NON-FLAT TERRAINS
Teresa Vidal-Calleja, Alberto Sanfeliu, Juan Andrade-Cetto

15:50 **Coffee break**

16:15 **End of the symposium**