CEANI R&D Group

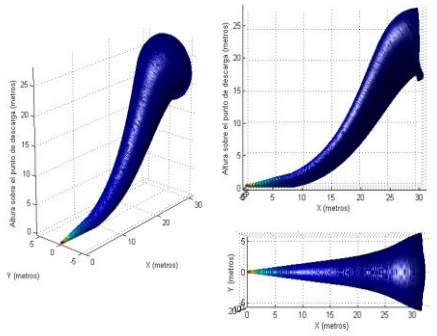
SIANI Institute, Las Palmas de Gran Canaria University (ULPGC), Spain

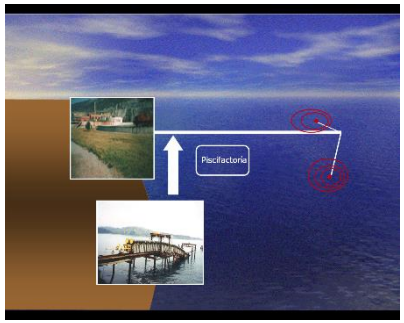
UNIVERSIDAD DE LAS PALMAS
DE GRAN CANARIA

Research Line:

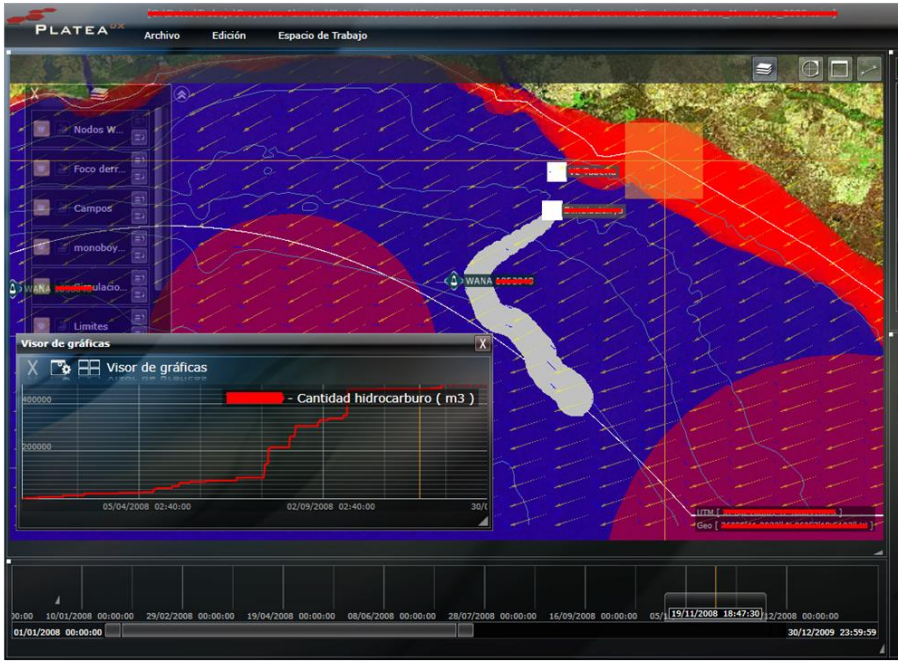
Marine and Costal Modelling

CURRENTS AND POLLUTANT DISPERSION 3D MODELS IN MARINE WATERS

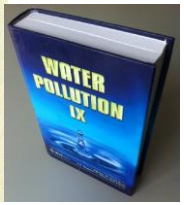


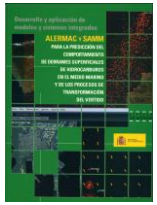


COASTAL ENVIRONMENTAL IMPACT FROM OIL SPILLS



2º National Research and Innovation Award
Ministry of Presidency, Spain, 2006
Develop and Application of the integrated systems ALERMAC and SAMM for oil spill behavior and wheatering processes in marine environments "

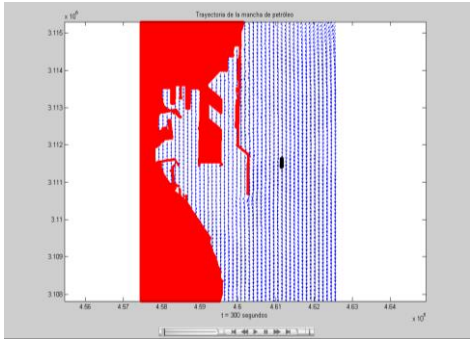


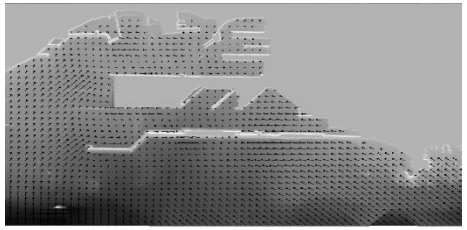


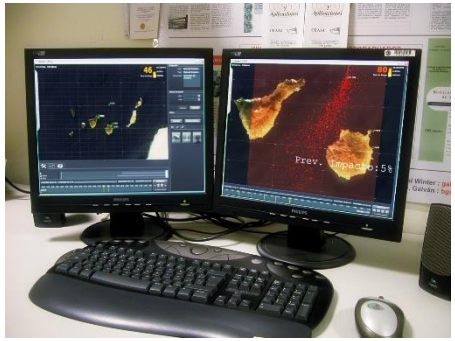
Award of the Ted Hromadka Prize for Excellence 2008 in Water Resources Wessex Institute of Technology, Water Pollution, 2008
"An Integrated System for Real Time Fight Against the Maritime and Coastal Pollution with Environmental Data Acquisition, Pollutant Spillages Modelling and Risk Management"

Research Line:

Marine and Costal Modelling







SOFTWARE DESARROLLADO

TRL 4-9

CODEB: Construcción 3D de tratamiento digital de batimetrías.

MMC: Construcción de campos de corriente y vientos 3D.

JET&PLUME: Dispersión en el mar de contaminantes asociados a aguas residuales y salmuera.

SLICK PATH: Trayectoria de hidrocarburos vertidos al mar.

WEATHERING: Evolución fisico-química de hidrocarburos vertidos al mar. Interacción con costas.

ALERMAC: Red Integrada de Monitorización, Alerta y Gestión de Riesgos de Vertidos Contaminantes e Incidentes Catastróficos en la Macaronesia .

SAMM: Sistema de Alerta y Monitorización Medioambiental.

PLATEA4D: Plataforma de Integración de Información, Modelos y Herramientas 2D y 3D

Research Line:

Marine and Costal Modelling

SCIENTIFIC AND TECHNOLOGICAL SUMMARY

- >15 NATIONAL AND INTERNATIONAL PROJECTS
- > 30 INDUSTRY ASSESSMENTS, STUDIES AND REPORTS
- 8 SPECIFIC CODES DELIVERED
- >25 SCIENTIFIC PAPERS, BOOKS AND REPORTS

PROJECT EXAMPLES

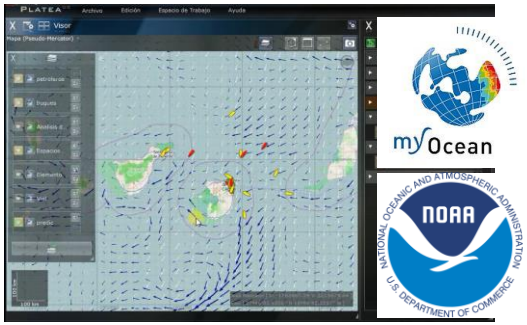
- Programa de Fomento de la Investigación Técnica (PROFIT) CIT-310100-2007-13) 01/07/07-31/12/08
- Participación en Proyectos GARP y ALERMAC en el marco de la INICIATIVA COMUNITARIA INTERREG III B 2000-2006)

NETWORK (>40)

Research Line:

Marine and Costal Modelling

PLATEA 4D
PLATAFORMA DE EXPLOTACIÓN Y ANÁLISIS DE INFORMACIÓN GEOTEMPORAL

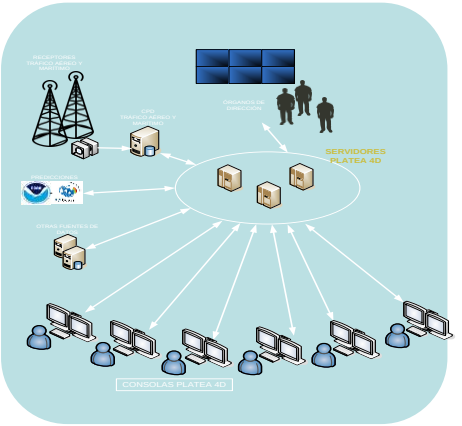


- R&D PROJECT, CEANI RESEARCH GROUP (ULPGC)
- 2001 – 2017
- 1.8 M€ INVESTED OVER 14 YEARS
- 10 NATIONAL AND INTERNATIONAL PROJECTS
- > 20 INDUSTRY ASSESSMENTS, STUDIES AND REPORTS
- 4 SPECIFIC CODES DELIVERED
- SEVERAL PARTNERS

Puertos de Las Palmas · Puertos de Tenerife · Isdefe · pt-PROTECMA · PORTOS DA MADEIRA · Gobierno de Canarias · intecmar · GSC · INERCO · CETMAR · AIS Hub data sharing center · REFINERÍA BALBOA · LIM · UPC · 112 CANARIAS · azti tecnalia · qualitas instruments · Heligràfics · REPSOL · Port de Tarragona · ULL Universidad de La Laguna

Ready for International Projects

TRL 8-9



Research Line: Who collaborates?

Optimum Design in Engineering

SIANI

International Relationships and Networking

Reviewed more than 100 papers for ISI-JCR International Journals

International Conferences Organization (at ULPGC):
EUROGEN 1995, Design and Optimization ERCOFTAC 2006, EUROGEN 2013

Organized Symposium / Thematic Sessions at International Conferences:
WCCM 2014, CMN 2015, EUROGEN 2015, EUROGEN 2017, CMN 2017, ECCOMAS 2018

Scientific / Program Committee Membership:
GECCO (2011-2017), IEEE-CEC (2016-2017), EUROGEN (2011-2017), Soft Computing in Environmental and Civil Engineering International Conference (2009-2015)

International Collaborators:
Jacques Periaux (Catedra UNESCO Numerical Methods at CIMNE-UPCataluña, Spain & Univ. Jyvaskyla, Finland); Jorge Magalhaes-Mendes (Politecnico Oporto, Portugal); Kalyanmoy Deb (Michigan State University, USA) Prabhat Hajela (Rensselaer Politechnic Institute, USA); (Google Scholar cites at June 2017, respectively: 7747, 1345, 101730, 6156)

On Course: Special Issue at *"Mathematical Problems in Engineering"* (JCR journal), 2017:
Evolutionary Algorithms and Metaheuristics: Applications in Engineering Design and Optimization
Lead Guest Editor: David Greiner; Guest Editors: Jacques Periaux, Domenico Quagliarella, Jorge Magalhaes-Mendes, and Blas Galván

Research Line: What is possible?

Optimum Design in Engineering

Automatically generated Artificial Intelligence
based Optimum Designs in Computational Engineering
With Metaheuristics / Evolutionary Algorithms

EU-Project BRRT-97-CT-5034: INGENET (1997-2002)

NETWORKED INDUSTRIAL DESIGN AND CONTROL APPLICATIONS USING GENETIC ALGORITHMS AND EVOLUTION STRATEGIES

Plan Nacional: DPI-2001-3570 (2001-2004)

SUBSISTEMAS SOFTWARE INTELIGENTE PARA DESPACHO, DESLASTRE Y REPOSICIÓN DE CARGAS EN SISTEMAS ELECTRICOS DE POTENCIA

Plan Nacional Mexico: CONACYT-P40721-Y (2003-2006)

OPTIMIZACIÓN DE ARMADURAS UTILIZANDO TÉCNICAS EVOLUTIVAS MULTIOBJETIVO

Contratos Transferencia Tecnológica:

Dassault Aviation – France (1994-1996)

Unelco – ENDESA (1998-2000)

Potentiality of Research Line:

http://www.human-competitive.org/awards

GECCO (ACM Association)
Conference Every Year

General Methods useful in any Computational Engineering Problem Design where a Software available solving problem in proper CPU time exists.

At SIANI,
Obtained Innovative Optimized Design Solutions in:

- Electric Power Engineering
- Computational Fluid Dynamics
- Structural Engineering
- Reliability Engineering and System Safety
- Noise Barrier Shape
- Others in Progress …

At SIANI, expertise in Innovative Methods:
Advanced Game Theory based Evolutionary Algorithms

Research Line: Where it is published?

Optimum Design in Engineering

Books: 2014

2015

Top Research Publications

Journals JCR Q1:

Computer Methods in Applied Mechanics and Engineering (2004)
Structural and Multidisciplinary Optimization (2012)
Applied Soft Computing (2014)
Journal of Sound and Vibration (2015)
Engineering Analysis with Boundary Elements (2016)

Archives of Computational Methods in Engineering (2016)

"Game Theory Based Evolutionary Algorithms: A Review with Nash Applications in Structural Engineering Optimization Problems"

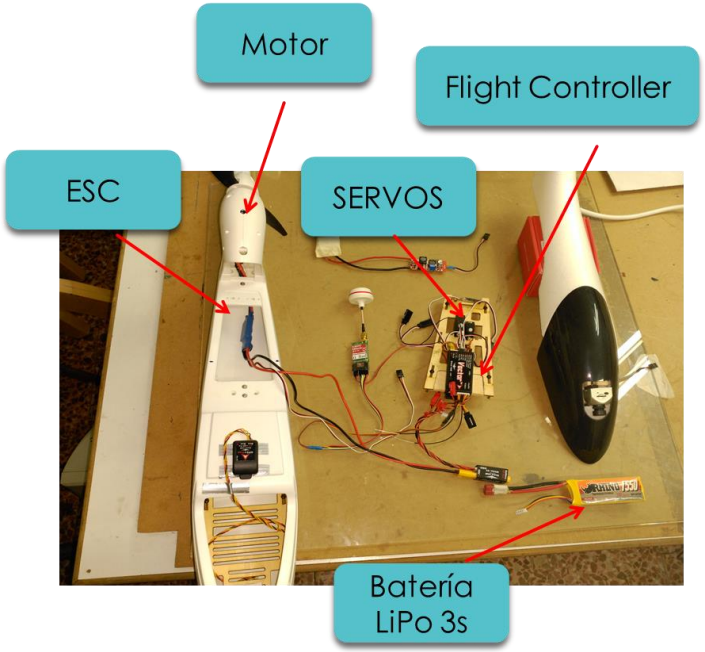
David Greiner, Jacques Periaux, Jose M. Emperador, Blas Galvan, Gabriel Winter

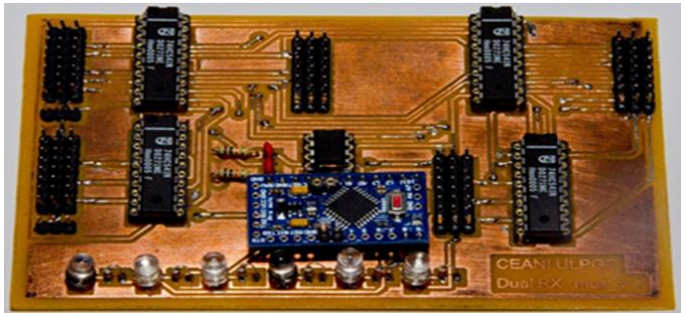
ISI Thomson Impact Factor (2015): 4.215

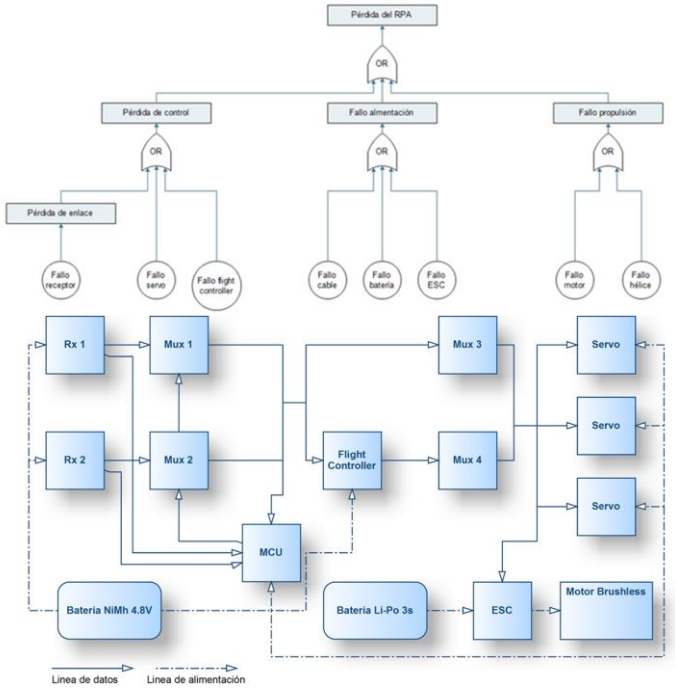
Ranked 1/101 in: Mathematics, Interdisciplinary Applications

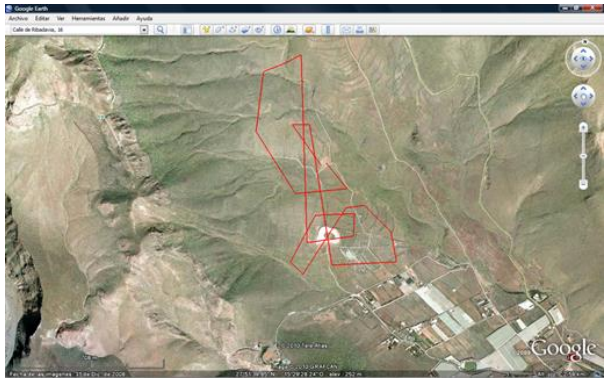
Research Line:

RPAS Reliability, Developments and Protocols



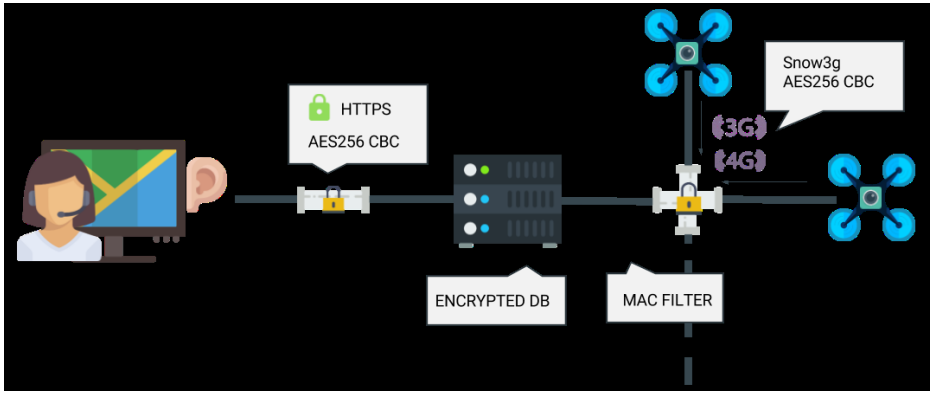


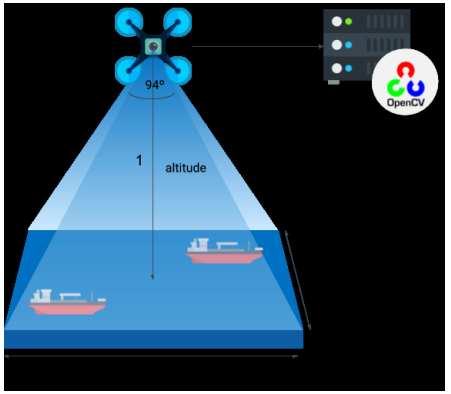




Research Line:

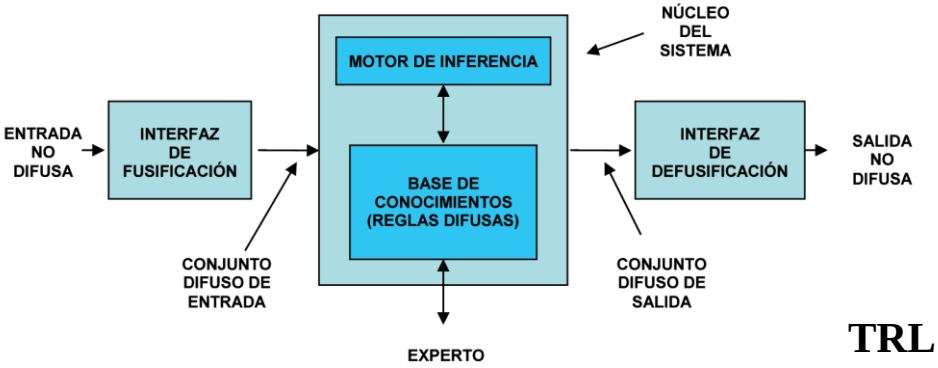
RPAS Surveillance systems (ULL Collaboration)



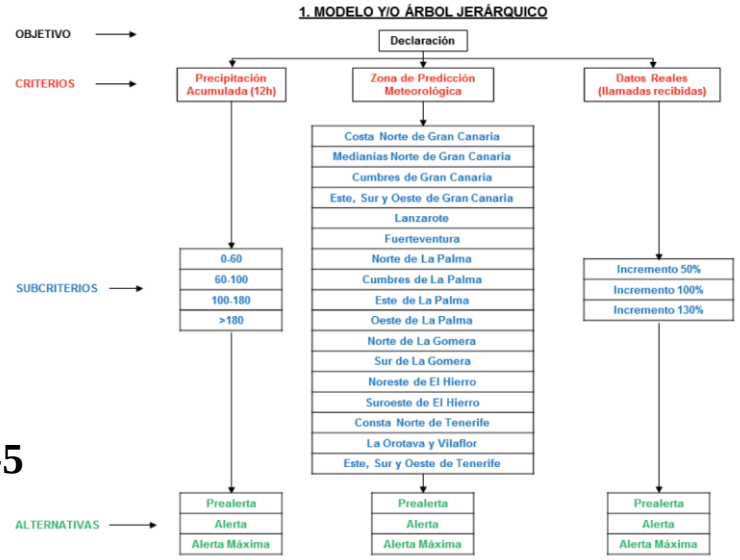


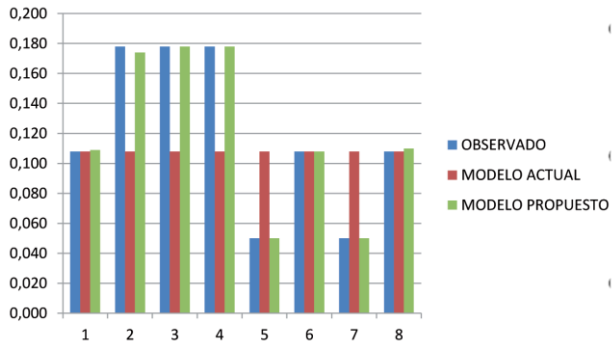
Research Line:
KDD Machine Learning, Publications and Patents

Analysis of environmental risks



TRL 4-5





- Secure UAV-Based System to Detect and Filter Sea Objects using Image Processing, EUROCAST, 02/2017
- Revisión tecnológica, normativa y aplicaciones de los UAV en la ingeniería (2), DYNA, 12/2016
- Expert system for decision-making based on Fuzzy Logic and AHP to adverse weather, DYNA, 09/2015
- **Patente:** Sistema de control redundante multifrecuencia para vehículos no tripulados, ES P201600540, 17/06/2016

Research Line:

Multiple Criteria Decision Analysis

Using: Optimization, Engineering Knowledge, Artificial Intelligence and Evolutionary Multi-Objective Optimization

SIANI

Participación en Proyectos Nacionales/Internacionales de I+D (1)

Título del proyecto: Diseño, validación y aplicación de nuevos **modelos de gestión de operaciones** basados en programación matemática aplicados a sistemas productivos y logísticos (2015 -2017)

Publicaciones Internacionales mas relevantes (4)

D. Greiner, J. M. Emperador, B. Galván, M. Méndez and G. Winter

Engineering Knowledge-Based Variance-Reduction Simulation and G-Dominance for Structural Frame Robust Optimization. Advances in Mechanical Engineering, 2013

Participación en libros y capítulos de libro más relevantes (2)

M. Maarouf, A. Sosa, B. Galván, D. Greiner, G. Winter, M. Méndez, R. Aguasca

The Role of **Artificial Neural Networks in Evolutionary Optimisation**: A Review. Advances in Evolutionary and Deterministic Methods for Design, Optimization and Control in Engineering and Sciences, Computational Methods in Applied Sciences, 2014

Contribuciones a Congresos Internacionales y Nacionales más relevantes (4+4)

M. Méndez, D. A. Rossit, A.L. Álamo, M. Frutos, R. Aguasca. Un algorithme évolutif avec division de l'espace des objectifs pour le problème de sac-à-dos bi-objectif en 0-1. Conference: ROADEF 2016 (Société Française de Recherche Opérationnelle et d'Aide à la Décision). Compiègne, Francia, 2016.

Luis Santacreu Rios, Alejandro Talavera Ortiz, Ricardo Aguasca Colomo, Máximo Méndez Babey, Blas Galván González, Dagoberto Castellano Nieves. Sistema Híbrido **AHP-Fuzzy Logic**, para **Toma de Decisiones en Entornos de Incertidumbre**. Aplicación a FMA. Conference: XVIII Congreso Español sobre Tecnologías y Lógica Fuzzy. ESTYLF 2016, España, 2016.

Research Line:

Machine Health Diagnosis and Prognosis

INTEGRATED DIAGNOSIS AND PROGNOSIS SYSTEMS (IDPS) TRL 5-6

Control Room & Database

RAW DATA

PREVENTIVE MAINTENANCE ACTIVITIES

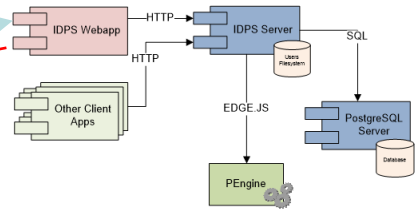
Operator / Owner

Selected Data

Degradation Diagnostic
Fault Prognostic

INTERNET

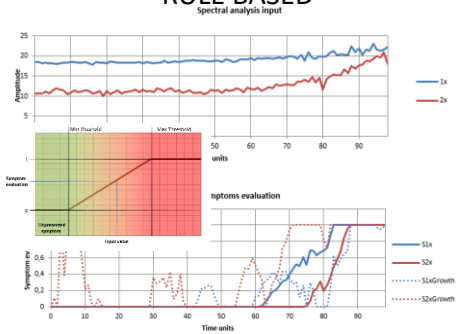
IDPS



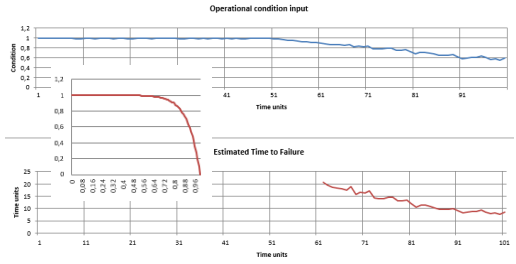
User Interface (friendly, Safe)
User programming tools
ISO standards compliant

METHODOLOGIES AND TEST CASES INCLUDED

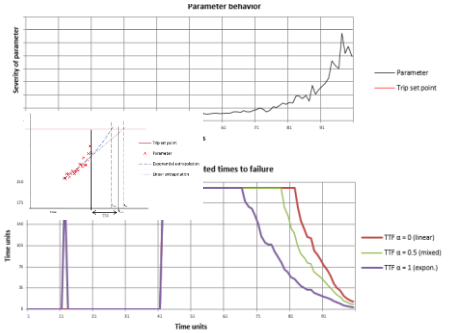
RULE BASED



P-F CURVE



TREND ANALYSIS



NETWORK: NEM SOLUTIONS (SPAIN, UK, USA), PREDITEC (SPAIN), RADICAL MANAGEMENT (ITALY), MACHINERY RELIABILITY INSTITUTE (USA), INGECON (PANAMA), ASSET CONSULTING (VENEZUELA), IBERINCO (SPAIN), COBRA (SPAIN)

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END

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