

CURRICULUM VITAE

FABIO PRINCIPE



PERSONAL INFORMATION

Name: **Fabio**
Surname: **Principe**
Date of birth: **28/01/1979**
Nationality: **Italian**
Address: [REDACTED]
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E-mail: **fabio.principe@gmail.com**
Homepage: **<http://fabioprincipe.altervista.org>**
Current Position: **System Engineer at the E.M. Framework Design Laboratory,
Ingegneria Dei Sistemi S.p.A. (link <http://www.idscompany.it/>)**

EDUCATION

- May 2007* **Ph.D. in Information Engineering**
at Dipartimento di Ingegneria dell'Informazione, University of Pisa, Pisa – Italy.
- *Research sector:* Communication Systems.
 - *Thesis title:* “**Iterative Message-Passing-Based Algorithms to Detect Spreading Codes**”.
 - *Supervisor:* Prof. Marco Luise.
- May 2003* **Master Degree in Telecommunications Engineering**
University of Pisa, Pisa – Italy.
- *Final grade:* **110/110 cum Laude**.
 - *Thesis title:* “**Analisi e Costruzione di Codici LDPC per Comunicazioni via Satellite**” (the English translation is : “Analysis and Design of LDPC Codes for Satellite Communications”) – *Supervisors:* Prof. Marco Luise, PhD Vincenzo Lottici, and PhD Luca Giugno.
 - *Award:* **Master Degree Award** of University of Pisa, because he achieved the Master Degree in just 5 Academic Years with the highest grade.
- July 1997* **Scientific Secondary School Certificate** (maturità scientifica)
Liceo Scientifico “F. Severi”, Castellammare di Stabia (NA) – Italy.
- *Final grade:* 54/60.
 - *Subjects covered:* scientific and humanistic.

REASERCH ACTIVITIES

Fields of Interest

General Research Interest

His research interests are in the general areas of signal processing, detection algorithms, signal synchronization (timing, carrier frequency and phase), satellite positioning systems (GPS, SBAS, LAAS, Galileo, GLONASS), CDMA techniques, modern coding theory (on LDPC, turbo-codes, etc.), and iterative decoding algorithms

(Message Passing, BCJR, etc.). He is also interested in low-complexity and efficient signal processing algorithms to develop communication systems following the software-radio paradigm (as GNU-Radio project, software-receiver for positioning applications, etc.). Currently, he has focused his studies on GNSS systems and augmentation techniques (such as GBAS and SBAS) for airnavigation applications, such as, aircraft land approaches (APV-I/II and CAT-I requirements), etc.

From Sept. 2005 to July 2007
(2nd – 3rd year as PhD student)

Research Activities

He investigated the possibility to develop iterative detection algorithms to acquire spread-spectrum sequences (LFSR sequences), exploiting iterative decoding algorithms of modern codes (ie. LDPC, turbo-codes). The final goal is to obtain a fast detection unit at low-complexity and good performance. Because of this, he focused the attention on LDPC and turbo-codes theory, their decoding algorithms (iterative Message Passing, and BCJR), spread spectrum detection algorithms, and CDMA techniques and receivers. Part of these studies were done at **USC (University of Southern California – Los Angeles, California USA)**, where he spent **about 7 months** (from the end of September 2005 to the end of April 2006) as **visiting scholar** working in collaboration with **Prof. Keith M. Chugg**.

From January 2004 to July 2005
(1st – 2nd year as PhD student)

Research Activities

During this period, his studies were addressed to investigate positioning systems (GPS, SBAS, Galileo, and GLONASS), their applications and characteristics, and signal structures. Indeed, he designed and implemented a software receiver (referred to as **SOFT-REC project**) for GPS and SBAS (made up of EGNOS, WAAS, and MSAS) signals following the software-radio paradigm. Therefore, he focused on CDMA communications, signal processing algorithms, synchronization techniques, frequency plan design, low-complexity and efficient software implementation, and theory and applications of satellite positioning systems. Furthermore, he also studied Galileo signals and their structures, designing a preliminary architecture of a Galileo receiver (**GARDA project** in cooperation with LABEN S.p.A.).

WORK EXPERIENCES

From 26 February 2007
(Current position)

System Engineer at the **E.M. Framework Design Laboratory, IDS S.p.A.**, project:

- SIAM (stand for *Innovative System for the Approach and Monitoring on the Airports*) with ENAV S.p.A. contract. In detail, he designed and implemented a simple RIMS-like (*Ranging and Integrity Monitor Stations*) station to monitor GNSS signals (specifically GPS/SBAS signals). Furthermore, he is involved in the GBAS (LAAS) experimentation and relative flight procedures at Palermo airport. GNSS static analyses and flight procedures are also foreseen in other regional airports (such as Parma, Perugia, and Taranto airports) in order to characterize the GPS/SBAS performance in these sites in compliance with the ICAO SARPs.

4-8 September 2006

He collaborated with the **Organization Staff** (made up of the general chairman, Prof. M. Luise, other professors/researchers of Dip. di Ingegneria dell'Informazione – Univ. of Pisa, and Incor DGMP s.r.l.) of **EUSIPCO 2006 Conference**, in Florence (Italy).

2004-2005

Consultant Activity (1st – 2nd years as PhD student)

During this period, he performed the following activities:

- Design and implementation of a GPS/SBAS software-receiver (referred to as **SOFT-REC project**), made in cooperation with INTECS S.p.A. under ESA contract. More specifically, he designed the frequency plan and developed all the signal processing and synchronization stages in C/C++ language to be run in real-time.
- Architectural design of a receiver for Galileo System signals (referred to as **GARDA, Galileo Receiver Development Activities**) made in collaboration with LABEN S.p.A. (now it is a part of Thales Alenia Space).

from June 2003 to October 2003

Consultant Activity – Contract with CPR (Consorzio Pisa Ricerche)

During this period, he worked as consultant for LABEN S.p.A. (now Thales Alenia Space). He studied and analyzed Galileo signals and performed Galileo/GPS frequency

plan during **GSR Galileo** and **ACE+ projects**.

REVIEW ACTIVITIES

- 2009
 - Review activity for **IEEE Transactions on Signal Processing**.
- 2008
 - Review activity for **IEEE Transactions on Signal Processing**.
- 2007
 - Review activity for **IEEE Transactions on Signal Processing**.
 - **WPMC 2007 Conference**, December 3-6 2007, Jaipur (India).
 - **PIRMC 2007 Conference**, September 3-7 2007, Athens (Greece).
- 2006
 - **ICASSP 2007 Conference**, April 15-20 2007, Honolulu, Hawaii (USA).
 - **EUSIPCO 2006 Conference**, September 4-8 2006, Florence (Italy).

PERSONAL SKILLS

Mother Tongue

Italian.

Other Languages

Good knowledge of oral and written English improved thanks to a period (about 7 months, 10/2005 – 04/2006) in Los Angeles CA (USA) at University of Southern California as **visiting scholar**, and thanks to the international conferences and trips in foreign countries (France, Holland, England, Spain, and Germany).

He also obtained:

- **Certificate of English language knowledge** (admission high level) received from Centro Linguistico Interdipartimentale University of Pisa in June 2004.
- **Certificate of English language knowledge** (admission 4th level) received from Trinity College London in June 1993.

Technical skills

Operating systems:

- **MS Windows** – good level;
- **Linux/Unix** – basic level of the OS, but good knowledge of the programming tools (*such as, gcc, Emacs, DDD, etc.*).

Programming languages:

- **C/C++**, **Pascal**, **Basic**, and **Fortran** – good level;
- **LaTeX** (and **MiKTeX**) – good level;
- **Matlab**, **Scilab**, **Mathematica**, **MathCad**, and **Octave** – good level;
- **Simulink** – basic level.

Graphical tools:

- **Igor Pro**, **MS Visio**, **Draw** (**OpenOffice** application) – good level;
- **GNU Plot**, **GIMP** – basic level.

Other applications:

- **MS Office** package, **OpenOffice** package, **MathType** – good level;
- **Dev C++**, **Code Warrior**, **Visual Studio** – good level;
- **WinEdt**, **TeXnicCenter**, **GNU Emacs** – good level.

Personal tendencies

Good disposition to learn technical/scientific subjects and to work in team.

OTHER CERTIFICATES

- 2009
 - **Certificate of Operator and Maintenance of the GBAS System (Thales)**.
- 2003
 - **Qualification to the profession of Engineer** received from University of Pisa (November 11, 2003).

1999	Certificate of technical master on “RGB TV” (“Televisione a Colori”) received from Scuola Radio Elettra di Torino (September 16, 1999).
1998/99	Admission to the 5th year of computer science course at ITIS “R. Elia”, Castellammare di Stabia (NA) – Italy.
1997/98	Secondary school certificate of Geometer (maturità tecnica per Geometra) received from Istituto Tecnico per Geometra “Vitruvio”, Castellammare di Stabia (NA) – Italy. <i>Final grade: 42/60.</i>
	Certificate of “Course of Safety Coordinator in Building Yard” (“Corso di Coordinatore della Sicurezza per la Progettazione ed Esecuzione dei Lavori”) laws 494/96 and 626/94.
1996	Certificate of “Operatore di Terminale” (basic course on computer science) received from Regione Campania (May 13, 1996).
	Certificate of “Manager Game 1996” of Confindustria received from “Gruppo Giovani Imprenditori” of Unione Industriali di Napoli (March 18, 1996).
	Certificate of “Master on Computer Graphic” received from Peruzzi University of Milano.
1994	Certificate of “Experimental Electronic” (“Tecnica Elettronica Sperimentale”) received from Scuola Radio Elettra di Torino.

OTHER INFORMATION

Other information

- Free from military service;
- Availability to be away on business.

ANNEXES

Annex 1

List of publications and technical reports.

DATA PROTECTION ACT

I agree that the mentioned personal data can be processed in compliance with the law of 196/2003 and its next modifications and integrations on safeguarding the right to privacy in connection with the processing of personal data.

List of Publications and Technical Reports - Annexes I attached to Fabio Principe CV -

BOOKS

Year 2009

- [1] **F. Principe**, *Rapid Acquisition in Direct-Sequence/Spread-Spectrum Systems: Iterative Message-Passing-Based Algorithms to Fast Acquire Spreading Sequences*, VDM Verlag, Germany, August 26, 2009, ISBN 978-3639191936.

INTERNATIONAL CONFERENCES

Year 2009

- [1] G. Del Duca, R. Perago, V. Paciucci, G. Di Bitonto, and **F. Principe**, "Verification of GNSS Applications at Italian Regional Airports," in *Proc. ENC-GNSS 2009 Conference*, Napoli (Italy), May 3-6, 2009.

Year 2008

- [2] M. Rovini, **F. Principe**, L. Fanucci, and M. Luise, "Implementation of Message-Passing Algorithms for the Acquisition of Spreading Codes," in *Proc. ICASSP 2008 Conference*, Las Vegas (USA), March 30 - April 4, 2008.

Year 2006

- [3] **F. Principe**, M. Luise, and K. M. Chugg, "Performance Evaluation of Message-Passing-Based Algorithms for Fast Acquisition of Spreading Codes with Application to Satellite Positioning," in *Proc. NAVITEC 2006*, ESTEC Noordwijk (The Netherlands), December 11-13, 2006.
- [4] **F. Principe**, K. M. Chugg, and M. Luise, "Rapid Acquisition of Gold Codes and Related Sequences Using Iterative Message Passing on Redundant Graphical Models," in *Proc. MILCOM 2006*, Washington DC (USA), October 23-25, 2006.

Year 2005

- [5] G. Bacci, **F. Principe**, M. Luise, C. Terzi, and M. Casucci, "SOFT-REC: a GPS Real Time Software Receiver with EGNOS Augmentation," in *Proc. Workshop on EGNOS Performance and Applications 2005*, Gdynia (Poland), October 27-28, 2005. (**Best Paper Award of Plenary Session "Applications and Tools – part 2"**)
- [6] **F. Principe**, C. Terzi, M. Luise, and M. Casucci, "SOFT-REC: a GPS/EGNOS Software Receiver," in *Proc. 14th IST Mobile & Wireless Communication Summit*, Dresden (Germany), June 19-23, 2005.

Year 2004

- [7] **F. Principe**, C. Terzi, M. Luise, and M. Casucci, "SOFT-REC: a Low-Cost GPS Receiver Following the Software Radio Paradigm," in *Proc. NAVITEC 2004*, ESTEC Noordwijk (The Netherlands), December 8-10, 2006.

TECHNICAL REPORT

Year 2009

- [1] **F. Principe**, *Progetto AIRNAS2 – Caratterizzazione dello Scenario GNSS presso l'Aeroporto di Bologna (cod. LIPE) – RT 09/008*. IDS S.p.A., Pisa (Italy), 2008.

Year 2008

- [2] **F. Principe**, G. Di Bitonto, and V. Paciucci, *SIAM-TN-035 Nota Tecnica di Caratterizzazione dello Scenario Locale GPS/SBAS presso l'Aeroporto "Falcone e Borsellino" di Palermo (codice LICJ) – RT 08/130*. IDS S.p.A., Pisa (Italy), 2008.
- [3] **F. Principe**, G. Di Bitonto, G. Gigli, and V. Paciucci, *SIAM-TN-035 Nota Tecnica di Caratterizzazione dello Scenario GPS/SBAS Locale presso Ciascun Sito (Aeroporti di Parma, Perugia e Grottaglie) – RT 08/082*. WP 8.1 Opzionale, Rev. 1.1, IDS S.p.A., Pisa (Italy), June 6, 2008.
- [4] C. Brogi and **F. Principe**, *Progetto Opere Civili ed Elettriche per l'Installazione GBAS presso l'Aeroporto "Falcone e Borsellino" di Palermo – RT 08/051*. IDS S.p.A., Pisa (Italy), 2008.
- [5] **F. Principe** and L. Fiori, *SIAM-DOC-090 Documento di Descrizione delle Attività di Upgrading GBAS ENAV – RT 08/029*. IDS S.p.A., Roma (Italy), March 17, 2008.

Year 2007

- [6] **F. Principe** and A. Italiano, *Analisi delle Prestazioni dell'Apparato VDF dell'Aeroporto di Rieti (Codice ICAO LIQN) –*

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- RT 07/084. IDS S.p.A., Pisa (Italy), May 4, 2007.
- [7] **F. Principe**, *Progetto Elettromagnetico/Orografico per la Sostituzione dell'Apparato ILS RWY 35L IMA (Aeroporto di Malpensa) – RT 07/074*. IDS S.p.A., Pisa (Italy), April 27, 2007.
- [8] F. Pozzi and **F. Principe**, *Progetto Elettromagnetico/Orografico di Installazione del Nuovo Apparato DME (Aeroporto di Torino/Caselle) – RT 07/058*. IDS S.p.A., Pisa (Italy), April 6, 2007.
- [9] F. Pozzi and **F. Principe**, *Progetto Elettromagnetico/Orografico Relativo alla Sostituzione dell'Apparato DME-PRU (Aeroporto di Perugia) – RT 07/057*. IDS S.p.A., Pisa (Italy), April 6, 2007.
- [10] F. Pozzi and **F. Principe**, *Progetto Elettromagnetico/Orografico di Installazione del Nuovo Apparato DME Aeroporto di Forlì (LIPK) – RT 07/056*. IDS S.p.A., Pisa (Italy), April 6, 2007.
- [11] **F. Principe** and F. Pozzi, *Progetto Elettromagnetico/Orografico Relativo alla Sostituzione del DME-P RWY 35L nell'Aeroporto di Malpensa (LIMC) – RT 07/053*. IDS S.p.A., Pisa (Italy), April 6, 2007.
- [12] **F. Principe** and F. Pozzi, *Progetto Elettromagnetico/Orografico di Installazione dell'Apparato DME-ORI (Aeroporto di Bergamo/Orio al Serio) – RT 07/052*. IDS S.p.A., Pisa (Italy), April 6, 2007.

Year 2005

- [13] G. Bacci, **F. Principe**, and M. Luise, *SOFT-REC: GPS/EGNOS Software Receiver. Technical Note: Verification of User Requirement 8 [UR8]*. Dip. di Ingegneria dell'Informazione – University of Pisa, Pisa (Italy), May 6, 2005.
- [14] **F. Principe**, G. Bacci, and M. Luise, *SOFT-REC: GPS/EGNOS Software Receiver. Technical Note: Signal Processing and Navigation Algorithms*. Dip. di Ingegneria dell'Informazione – University of Pisa, Pisa (Italy), July 15, 2005.
- [15] **F. Principe**, G. Bacci, and M. Luise, *SOFT-REC: GPS/EGNOS Software Receiver. Technical Note: Signal Processing and Navigation Algorithms Software Description*. Dip. di Ingegneria dell'Informazione – University of Pisa, Pisa (Italy), July 15, 2005.
- [16] **F. Principe**, M. Luise, and L. Fanucci, *GREAT (Galileo Receiver Advanced Testbed). GARDA Receiver Architecture*. Dip. di Ingegneria dell'Informazione – University of Pisa, Pisa (Italy), January 10, 2005.

DOCTORATE PUBLICATIONS

Year 2007

- [1] **F. Principe** (year 2004; tutor: Prof. Marco Luise), *Iterative Message-Passing-Based Algorithms to Detect Spreading Codes*. Dipartimento di Ingegneria dell'Informazione - University of Pisa, Pisa (Italy), February 26, 2007.

Year 2006

- [2] **F. Principe** (year 2004; tutor: Prof. Marco Luise), "Performance Evaluation of Iterative Message Passing Algorithms for Fast Acquisition of Spreading Codes with Application to Satellite Positioning," in *Proceedings Doctoral Workshop 2006 – Telecom. Systems*, Dip. di Ingegneria dell'Informazione - University of Pisa, Pisa (Italy), November 15, 2006.