

## Europass Curriculum Vitae

### Personal information

Surname(s) / First name(s)

Address(es)

Telephone(s)

Email(s)

Nationality(-ies)

Date of birth

Home page

Current Position

**Principe Fabio**

Leiden, The Netherlands

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[fabio.principe@gmail.com](mailto:fabio.principe@gmail.com)

Italian

January 28, 1979

<http://fabioprincipe.altervista.org/>

**Radio Navigation Eng. at ESA/ESTEC (HE Space Operations B.V.)**  
HE Space Operations B.V. webpage: <https://www.hespace.com/>.



### Education

May 2007

**Ph.D. in Information Engineering** at the 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, Ph.D. Vincenzo Lottici, and Ph.D. Luca Giugno.
- *Award:* Master Degree Award of University of Pisa, because he achieved the Master Degree in 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.

## Research Activities

Fields of Interest

From Sept. 2005 to Jan. 2007  
(2nd & 3rd year of PhD course)

### General research interests

His research interests are in the general areas of radio navigation, *communication systems* and *signal processing algorithms*. He worked on signal detection and synchronization algorithms, spread-spectrum systems, modern coding theory (e.g., LDPC and turbo-codes), digital beamforming, directional modulation and *software-defined radio* (SDR) techniques and technologies. Furthermore, since 2003 he was involved in many projects on GNSS systems, having a specific focus on air-navigation domain where the fulfil of *safety-of-life* requirements is the main target.

### Research Activities

He investigated the possibility to develop iterative detection algorithms to acquire spread-spectrum sequences by exploiting the iterative decoding algorithms coming from modern coding theory (e.g., LDPC codes). The final goal was to achieve rapid, low-complexity and good-performance algorithms able to acquire spread-spectrum codes. Because of this, he focused his 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 carried out at the *University of Southern California* (USC) Los Angeles (California, USA), where he spent about 7 months (Sept. 2005-April 2006) as visiting scholar and by collaborating with *Prof. Keith M. Chugg*.

From June 2003 to July 2005  
(1st & 2nd year of PhD course)

### Research Activities

During this period, he focused his studies on GNSS systems (GPS, SBAS, Galileo, and GLONASS), their specific characteristics, signal structure, and receiver design. Furthermore, he designed and implemented the acquisition and tracking stages of one of the 1st *SDR-based* GPS/SBAS receiver (SOFT-REC project, in cooperation with INTECS S.p.A.) able to operate in real-time. This result was achieved by developing low-complexity, efficient signal processing and synchronization algorithms optimized to guarantee the real-time processing of the received positioning signals. Furthermore, he also studied the structure of Galileo signals in order to design a preliminary architecture of a Galileo receiver (GARDA project, in cooperation with LABEN S.p.A.).

## Work Experiences

From 17 May 2021 till now  
(*current position*)

### Radio Navigation Engineer at ESA/ESTEC on behalf of HE Space Operations B.V.

He is involved in the management of commercial and R&D activities in the field of GNSS receivers, and simulators. He also provides support to D/NAV for Galileo Second Generation System Test-Bed.

From 1 July 2020 till now  
(*current position*)

### Responsible for the Radio Navigation & Communication Systems Lab. of INTECS Solutions S.p.A.

His main tasks: (i) team manager, (ii) bid proposal and preparation, and (iii) project manager.

- *GIASONE Project*. Cofinanced project, in the framework of the ESA program NAVISP Elem. 2. Main objective: design and implementation of a GNSS monitoring infrastructure addressed to provide the user segment with a number of services oriented to GNSS status monitoring, signal authentication, performance assessment, etc. He is the technical responsible for the project.

15 Jan. 2020-30 June 2020

**Responsible for the GNSS Systems B.U. of INTECS Solutions S.p.A.**

His main tasks: (i) team manager, (ii) bid proposal and preparation, and (iii) project manager. Here below the most recent projects.

- *G-PASSION Project*. Cofinanced project, in the framework of the ESA program NAVISP Elem. 2. Main objective: design and implementation of an authentication system of Galileo E1 open service. He coordinated and supported the technical team during the last phases of the project. The project was successfully terminated.

26 Feb. 2007-14 Jan. 2020

**Senior Radio Navigation and Communication Engineer at the Communication, Navigation, & Surveillance (CNS) Lab. of IDS S.p.A.**

He actively worked on the following projects.

- *ENDORSE Project*. He was the technical responsible for the design and development of a coherent, effective GPS spoofer for anti-drone applications. This project was sponsored by the Italian MoD.
- *BLUEGNSS Project*. He was the technical responsible for the design and development of BLUEGNSS monitoring network. Such monitoring network provides the GNSS performance assessment within the BLUEMED area. In the framework of this project IDS collaborates with Italian, Greek, Maltese, and Cypriot AirNavigation Service Providers (ANSPs).
- *LICOLA I and II* (stands for Low-Interceptable Communication Link Antennas) project sponsored by the Italian MoD. Analysis of the directional modulation techniques to design and implement a low-interceptable transmitter. At the end of the 1st phase (LICOLA I project) a SDR-based transmitter provided with a linear antenna array, operating in DM-mode, was developed. At the end of the 2nd phase a configurable 8x8 antenna array (64 radiating elements) was developed and successfully test. Such device is able to operate as a standard beam-former and in directional-modulation mode.
- Technical responsible for the design and development of the *GNOME* (GNSS Operative Monitoring Equipment) system.
- *PEGASUS* (stands for Platform of Enhanced GNSS receiver for Application in Sol User Segment) project sponsored by ASI (Agenzia Spaziale Italiana). In the framework of this project, he studied the possibility of integrating digital beam-forming technologies in GNSS receivers in order to improve their performance for safety-of-life applications.
- GNSS experimental activity with AgustaWestland. He studied the impact of moving rotor blades on GNSS performance (antenna siting activity).
- *SIAM* (stands for Innovative System for the Approach and Monitoring on the Airports) sponsored by ENAV S.p.A. This experimental project aimed at verifying the GNSS application for flight procedures on Italian regional airports (in compliance with the ICAO SARPs). In this context, he designed and implemented a GPS/SBAS monitoring station, which was intensively used for GBAS siting applications and characterization of GNSS scenarios in many Italian airports (Palermo, Parma, Perugia, Grottaglie, etc.).
- Development and maintenance of some software units belonging to the *EMACS* framework.

- Activity of EM analysis and simulation (by mean *EMACS software*) to analyze new installations or replacements of radio-aids (mainly DME, VOR, and ILS systems) within some Italian airports.
- 4-8 September 2006 **He joined the organization staff of EUSIPCO 2006 Conf.**, held in Florence (Italy). The staff included Prof. M. Luise, the general chairman, other professors and researchers of Dip. di Ingegneria dell'Informazione (Univ. of Pisa), and Incor DGMP s.r.l.
- 2004-2005 **Consultant Activity (1st – 2nd years as PhD student).**  
He was involved in the following activities.
- Design and implementation of a real-time GPS/EGNOS software-receiver (SOFT-REC project, sponsored by ESTEC), developed in cooperation with INTECS S.p.A. Specifically, he implemented the signal processing and synchronization stages (in C/C++ language) of the software receiver.
  - Architectural design of a receiver for Galileo signals (referred to as GARDA, GALileo Receiver Development Activities) made in collaboration with LABEN S.p.A. (now TAS-I, ThalesAlenia Space Italy).
- From June 2003 to October 2003 **Consultant Activity – Contract with CPR (Consorzio Pisa Ricerche).**  
He worked as consultant for LABEN S.p.A. (now TAS-I). He studied and analysed Galileo signals and performed Galileo/GPS frequency plan during *GSR Galileo* and *ACE+* projects.

## Review Activities

- 2019 He served as reviewer of **IEEE Communications Magazine**.
- 2017 He served as reviewer of **IEEE Transactions on Communications**.
- 2016 He served as reviewer of:
- **IEEE Communications Letters**;
  - **APACE 2016 Conference**, December 11-13, 2016, Langkawi, Malaysia.
- 2015 He served as reviewer of **IEEE Communications Letters**.
- 2014 He served as reviewer of:
- **EURASIP Signal Processing**;
  - **IEEE Signal Processing Letters**;
  - **URSI General Assembly and Scientific Symposium 2014**, August 16-23, 2014, Beijing, China.
- 2013 He served as reviewer of **IEEE Communications Letters**.
- 2012 He served as reviewer of:
- **IEEE Communications Letters**;
  - **IEEE Symposium on Industrial Electronics and Applications 2012**, Sept. 23-26, 2012, Bandung (Indonesia).

- 2011 He served as reviewer of:
- **EURASIP Signal Processing;**
  - **IEEE Communications Letters;**
  - **International Journal of Navigation and Observation**, Hindawi Publishing Corporation.
- 2010 He served as reviewer of:
- **EURASIP Signal Processing;**
  - **IEEE Communications Letters;**
  - **IEEE Transactions on Signal Processing;**
  - **ISIT 2010 Conference**, June 13-18, 2010, Austin, Texas (USA).
- 2009 He served as reviewer of:
- **EURASIP Signal Processing;**
  - **IEEE Communications Letters;**
  - **IEEE Transactions on Signal Processing.**
- 2008 He served as reviewer of **IEEE Transactions on Signal Processing.**
- 2006-2007 He served as reviewer of:
- **IEEE Transactions on Signal Processing;**
  - **WPMC 2007 Conference**, December 3-6 2007, Jaipur (India);
  - **PIRMC 2007 Conference**, September 3-7 2007, Athens (Greece).
  - **ICASSP 2007 Conference**, April 15-20 2007, Honolulu, Hawaii (USA);
  - **EUSIPCO 2006 Conference**, September 4-8 2006, Florence (Italy).

## Personal Skills and Competences

Mother tongue(s)

**Italian.**

Other languages

**Good knowledge of oral and written English language**, improved on-field thanks to a long period (about 7 months, 10/2005 – 04/2006) spent in Los Angeles CA (USA) at the University of Southern California, and thanks to several travels abroad (France, Holland, England, Spain and Germany) for business and conferences. He also achieved the following certificates.

- **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.

<p>Technical skills</p>	<p>Operating systems:</p> <ul style="list-style-type: none"> <li>– MS Windows – good knowledge;</li> <li>– Linux – good knowledge.</li> </ul> <p>Programming languages:</p> <ul style="list-style-type: none"> <li>– C/C++, Pascal, Basic, and Fortran – good knowledge;</li> <li>– LaTeX – good knowledge;</li> <li>– Matlab, Scilab, Mathematica, MathCad, and Octave – good knowledge;</li> <li>– Simulink – basic knowledge.</li> </ul> <p>Graphical tools:</p> <ul style="list-style-type: none"> <li>– MS Visio, Draw (of OpenOffice), Paint.Net, Igor Pro, Gimp – good knowledge;</li> <li>– GNU Plot – basic knowledge.</li> </ul> <p>Other SW applications:</p> <ul style="list-style-type: none"> <li>– MS Office package, OpenOffice package, MathType – good knowledge;</li> <li>– Dev C++, Code Warrior, Visual Studio, Qt Creator – good knowledge.</li> </ul>
<p>Personal predisposition</p>	<p>Optimum attitude towards learning technical/scientific topics and to work in team.</p>

### Other Certificates

<p>2020</p>	<p><b>Certificate of participation at the leadership course</b>, released by MultiOlistica (Dec., 2020).</p>
<p>2011</p>	<p><b>Certificate of participation at the GPU programming course</b>, released by CILEA (April 8, 2011).</p>
<p>2009</p>	<p><b>Certificate of operator and maintenance of Thales GBAS system</b>, released by Thales ATM.</p>
<p>2003</p>	<p><b>Qualification to the profession of engineer</b>, released by University of Pisa (Nov. 11, 2003).</p>
<p>1998/1999</p>	<p><b>Certificate of "RGB TV" ("Televisione a Colori")</b>, released by Scuola Radio Elettra di Torino (Sep. 16, 1999).</p>
<p>1997/1998</p>	<p><b>Admission to the 5th year of computer science course</b> at ITIS "R. Elia", Castellammare di Stabia (NA), Italy.</p>
<p>1997/1998</p>	<p><b>Secondary school certificate of Geometer</b> (maturità tecnica per Geometra), released by Istituto Tecnico per Geometra "Vitruvio", Castellammare di Stabia (NA), Italy. Final grade: 42/60.</p>
<p>1997/1998</p>	<p><b>Certificate of "Course of Safety Coordinator in Building Yard"</b> ("Corso di Coordinatore della Sicurezza per la Progettazione ed Esecuzione dei Lavori") laws 494/96 and 626/94.</p>

1996	<p><b>Certificate of “Operatore di Terminale”</b> (basic course on computer science), released by Regione Campania (May 13, 1996).</p> <p><b>Certificate of “Manager Game 1996” of Confindustria</b>, released by “Gruppo Giovani Imprenditori” of Unione Industriali di Napoli (March 18, 1996).</p> <p><b>Certificate of “Master on Computer Graphic”</b>, released by Peruzzi University of Milano.</p>
1994	<p><b>Certificate of “Experimental Electronic”</b> (“Tecnica Elettronica Sperimentale”), released by Scuola Radio Elettra di Torino.</p>

## Other Information

Other Information	<p>Free from military service.</p> <p>Availability to be away on business.</p>
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## Annexes

Annex 1	List of my publications.
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## 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**  
**- Annexes 1 attached to Fabio Principe CV -**

**BOOKS**

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

**JOURNALS/MAGAZINES**

- [1] **F. Principe**, G. Di Bitonto, A. Tomei, P. Vanni, and K. Strelcova, "BLUEGNSS Project - A Step Towards E-GNSS Harmonization in the Air Navigation Sector," *Inside GNSS Magazine*, vol. 13, no. 6, Nov./Dec. 2018. (**Inside GNSS front cover**)
- [2] **F. Principe**, G. Bacci, F. Giannetti, and M. Luise "Software-Defined Radio Technologies for GNSS Receivers: a Tutorial Approach to a Simple Design and Implementation," *International Journal of Navigation and Observation*, vol. 2011, article ID 979815, 27 pages, 2011, doi: 10.1155/2011/979815.

**INTERNATIONAL CONFERENCES**

- [1] V. Pellegrini, **F. Principe**, R. Guidi, G. Scozza, G. de Mauro, and R. Cioni, "Adding PHY-Layer Crypto to COFDM Radios through a Large Array with Directional Modulation," in *Proc. GLOBECOM 2018*, Abu Dhabi (UAE), December 9-13, 2018.
- [2] **F. Principe**, G. Di Bitonto, A. Tomei, V. Pellegrini, and G. Morelli, "Development of a GNSS Monitoring Network Within the Mediterranean Area for Air Navigation Applications - BLUEGNSS Project," in *Proc. NAVITEC 2018*, ESTEC Noordwijk (The Netherlands), December 5-7, 2018.
- [3] V. Pellegrini, **F. Principe**, G. de Mauro, R. Guidi, V. Martorelli, and R. Cioni, "Cryptographically Secure Radios Based on Directional Modulation," in *Proc. ICASSP 2014*, Firenze (Italy), May 4-9, 2014.
- V. Pellegrini, **F. Principe**, G. de Mauro, R. Guidi, V. Martorelli, and R. Cioni, "Cryptographically Secure Radios Based on Directional Modulation - A Real-World, Hands-on Demonstration," *ICASSP 2014 Show&Tell*, Firenze (Italy), May 9-4, 2014.
- [4] V. Pellegrini, **F. Principe**, A. Tomei, M. Mori, M. Natali, and R. Cioni, "The GNSS Operative Monitoring Equipment (GNOME): an SDR-Based Solution for Integrity Assurance," in *Proc. NAVITEC 2012*, ESTEC Noordwijk (The Netherlands), Dec. 5-7, 2012.
- [5] A. Italiano, **F. Principe**, R. Cioni, and R. Perago, "Multipath and Interference Modelling in Complex GNSS Scenarios," in *Proc. EuCAP 2010 Conference*, Barcellona (Spain), April 12-16, 2010.
- [6] 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.
- [7] 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.
- [8] **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), Dec. 11-13, 2006.

- [9] **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), Oct. 23-25, 2006.
- [10] 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"**)
- [11] **F. Principe**, C. Terzi, M. Luise, and M. Casucci, "SOFT-REC: a GPS/EGNOS Software Receiver," in *Proc. 14<sup>th</sup> IST Mobile & Wireless Communication Summit*, Dresden (Germany), June 19-23, 2005.
- [12] **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), Dec. 8-10, 2006.

## DOCTORATE PUBLICATIONS

- [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), Feb. 26, 2007.
- [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), Nov. 15, 2006.