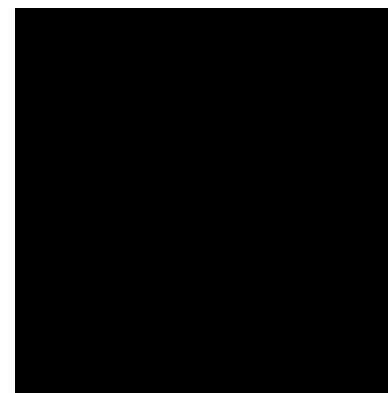


CURRICULUM VITAE

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1 Main details

1.1 Italian National Scientific Qualifications awarded for Full Professor positions (“Abilitazioni Scientifiche Nazionali di I fascia”)

Academic Recruitment Field (“Settore Concorsuale”)
08/A4 Geomatica (Geomatics)

1.2 Academic Position

Qualification/Title	Full Professor
University	Politecnico di Torino
Department	DIATI
Academic Recruitment Field (if the candidate holds a position in an Italian University, she/he should insert the “Settore Concorsuale”)	08/A4 Geomatics (“Geomatica”)
Academic Discipline (formally named “Settore Scientifico Disciplinare”, only for candidates who hold a position in an Italian University)	ICAR/06 Surveying and Cartography (“Topografia e Cartografia”)

1.3 Working experience

Dates (from .. to..)	From 01/11/1999 to 31/10/2006
Name and address of the Employer (Public or/and private institution/body)	Politecnico di Torino C.so Duca degli Abruzzi 24 10129 Torino (TO), ITALY
Position held (for positions in Universities, the candidate should indicate the Faculty/College/School and the Department; in case of Italian Universities the candidate is also requested to indicate the “Settore Scientifico Disciplinare”)	Researcher “Settore Scientifico Disciplinare”: ICAR/06 Surveying and Cartography (“Topografia e Cartografia”) I Faculty of Engineering Department of Georesources and Land (DIGET), then Department of Land, Environment and Geotechnologies Engineering (DITAG)

Main activities/responsibilities	Member of some boards of department: - Building Board (from 2003 to 2006); - Information and Communication Technology board
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Dates (from .. to..)	From 01/11/2006 to 2017
Name and address of the Employer (Public or/and private institution/body)	Politecnico di Torino C.so Duca degli Abruzzi 24, 10129 Torino (TO), ITALY
Position held (for positions in Universities, the candidate should indicate the Faculty/College/School and the Department; in case of Italian Universities the candidate is also requested to indicate the "Settore Scientifico Disciplinare")	Associate Professor "Settore Scientifico Disciplinare": ICAR/06 Surveying and Cartography ("Topografia e Cartografia") I Faculty of Engineering (from 2006 to 2011) Former Department of Land, Environment and Geo-technologies Engineering (DITAG), now Department of Environment, Land and Infrastructure Engineering (DIATI)
Main activities/responsibilities	From 2006 to 2010, Member of Departmental board ("giunta di dipartimento", elective position). Member of some boards of department: - Building Board (from 2006 to today); - Information and Communication Technology board (from 2006 to today). Person in charge of the laboratory of Photogrammetry Geomatics and GIS (GeoGIS Lab) from 2007. Responsible for Politecnico di Torino (directly nominated by the Rector) of X-team project (International Centre of Cultural Heritage Security, ICCHS)

Dates (from .. to..)	From 2017 to today
Name and address of the Employer (Public or/and private institution/body)	Politecnico di Torino C.so Duca degli Abruzzi 24, 10129 Torino (TO), ITALY
Position held (for positions in Universities, the candidate should indicate the Faculty/College/School and the Department; in case of Italian Universities the candidate is also requested to indicate the "Settore Scientifico Disciplinare")	Full Professor "Settore Scientifico Disciplinare": ICAR/06 Surveying and Cartography ("Topografia e Cartografia") Department of Environment, Land and Infrastructure Engineering (DIATI)
Main activities/responsibilities	Member of some boards of department: - Building Board (from 2006 to today); - Information and Communication Technology board (from 2006 to today). Person in charge of the laboratory of Photogrammetry Geomatics and GIS (GeoGIS

	<p>Lab) from 2007.</p> <p>Responsible for Politecnico di Torino (directly nominated by the Rector) of X-team project (International Centre of Cultural Heritage Security, ICCHS)</p> <p>Proposer and Member of Management board of PIC4SeR (Polito Interdipartimental Centre of Service Robotics)</p>
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Dates (from .. to..)	From 2017 to today
Name and address of the Employer (Public or/and private institution/body)	<p>SIR srl, Innovative Solution for surveying (“Soluzioni Innovative per il Rilevamento”) From 2014, SIR srl has been included in Ad Hoc 3D solutions s.r.l., Current address: Fraz. La Roche, 8 - 11020 Gressan (AO), Aosta</p>
Position held (for positions in Universities, the candidate should indicate the Faculty/College/School and the Department; in case of Italian Universities the candidate is also requested to indicate the “Settore Scientifico Disciplinare”)	Company President
Main activities/responsibilities	<p>President of board of Governors Business partner</p> <p>In addition, the main practical activities were:</p> <ul style="list-style-type: none"> - Design and development of the commercial version of Solid Image visualization software tool (SIRio); - 3D survey of hydraulic system related to the hydroelectric power station of HONE (Aosta) for CVA (Compagnia Valdostana delle Acque, Compagnie Valdôtaines des Eaux S.p.A.); - 3D GIS generation of castle of Buronzo (VC) using primary data acquired by photogrammetric techniques - 3D survey using terrestrial LiDAR techniques of the Cathedral of Vercelli (VC); - 3D Survey using terrestrial LiDAR techniques and Solid Images for rock face stability analysis in IPOH (Malaysia) - Solid Images generation using long range LiDAR data for rock face stability analysis in Gondo (Switzerland); - Innovative solution of 3D LiDAR survey and Solid Images Database for the subway of Algeri (Maroc).

1.4 Education and Training (please use the following table to describe Degrees awarded, by only indicating the information concerning Bachelor's Degree, Master of Science's Degree or/and PhD)

Date	22/02/1994
Institution which issued the degree	Politecnico di Torino
Type of Degree awarded (only Bachelor's Degree, Master of Science's Degree, PhD)	Master of Science's Degree in Civil Engineering, specializing in transport, sub-specialization Territory and Surveying

Date	17/04/1998
Institution which issued the degree	Politecnico di Milano
Type of Degree awarded (only Bachelor's Degree, Master of Science's Degree, PhD)	PhD in Geodetic and Topographic Sciences ("Geodesia e Topografia"), X cycle

2 Scientific Activity

2.1 Main research products

2.1.1 Digital True Orthophoto

The first presented product is the paper

[162] Dequal S.; Lingua A.M.; *True orthophoto for architectural surveys*. In: **proceedings of XVIII International Symposium of CIPA**, 2001.

From 2001, it was well known the problem of true orthophoto or rather the problem of producing a representation in photographic form in which all the perspective deformations are eliminated, even those related to the objects in elevation with respect to the used elevation model.

The used method was essentially applied on the territory and then related to a digital terrain model (DTM). Two main solutions were essentially used:

- The first, based on the use of DTM, solved the problem of residual perspective distortions related to "in elevation" objects by means of mosaicking techniques that assembled the central portions of several digital images, often captured with long focal length (normal focal length on the aerial platforms);
- the second (first proposed by Amhar F., R. Ecker, 1996: An integrated solution for the problem of man-made objects in 3D digital orthophotos. In: International Archives of Photogrammetry and Remote Sensing, Vol. XXXI / B4, pp . 84-89) was based on the use of the DTM and a detailed description of the buildings and other "in elevation" objects in the form of 3D model that were processed in an integrated solution by means of a very complex operating procedure requiring computing power, huge storage and very high time consuming procedures.

The innovation of my selected product is related to the proposal of a new operative procedure based on the use of:

- a shape model of the object to be represented in the form of dense digital surface models (DDSMs) where the mesh size is close to the precision of the nominal scale of digital orthophoto to produce (the contextual development of laser scanning techniques has enabled a simple production of this type of data);

- numerous images of the object from which to extract the photographic information requests by the orthophoto.

The proposed procedure can be applied on less powerful computers and it is able to solve problems related to the residual perspective distortion, the hidden areas, the presence of noise elements (grid crosses, noise shown in the photos as birds, lampposts, and so on).

The approach makes the procedure independent from the object type allowing the production of true orthophotos also for archaeological or architectural objects in which there are numerous discontinuities.

In this case, after designing myself a solution to the problem approved and improved by other authors, I developed the computer code in Fortran language ("ACCORTHO" or ACCurate ORTHOphoto) and defined the operational improvements for the solution of the presence of noisy objects in the original images.

The innovation impact is highlighted by:

- the Best Poster Award attributed September 20, 2001 during the XVIII International Symposium of CIPA (Comité International de Photogrammétrie Architecturale, International Committee for Architectural Photogrammetry) by the Executive Committee of CIPA;
- the number of the product quotations: 13 (10 without self-citations) in Google Scholar, Scopus citation is not defined, because the product is not indexed in this database.

The product has been developed over time through:

- an archaeological field application ([161]);
- an urban application using laser scanner data acquired by aerial platform ([157]);
- an evolution necessary to apply the procedure in urban areas by generating the DDSM using large scale digital mapping, automatic selection of all images that contain a certain area from an entire photogrammetric block and the definition of a procedure for local homogenization of color components related to various images ([127]). This application was developed under a research agreement with the City of Turin for the creation of true orthophoto throughout the city at the nominal scale 1:2000;
- the improvement to images acquired by the satellite platform ([146]);
- an application to a complex subject like the façade of San Marco in Venice ([137]);
- the proposal for an innovative product called Solid True OrthoPhotos (STOP) that integrates the true orthophotos and the DDSM used to generate it into a single self-consistent data ([127]). In this context I developed the visualization software with query capabilities ("STOPviewer") in freeware version that can be downloaded from the internet site of my laboratory of photogrammetry, geomatics and GIS of DIATI at the Politecnico di Torino (http://areeweb.polito.it/geomatics_lab);
- an application at very large scale (1: 500) for the municipality of Lainate ([111]);
- the realization of a prototype version of the web viewer of STOP which won the Best Poster Awards at ASITA 2008 conference ([107]);
- A new integrated version for "in field" survey applications called GSTOP (GNSS STOP) which integrates some navigational sensors (position and attitude) with STOP viewer ([56]).

In the various contributions related to the product over 80 quotations (source Google Scholar) can be identified.

I am considered an expert in the subject thanks to the many papers, as evidenced by the activities related to:

- the definition of guidelines for the production of digital orthophotos and digital elevation models at scale 1:10000 ([94]) and large and very large scale ([74]) following the research agreement with the Interregional Center for Geographic Information (CISIS). The documents derives from an equal contribution of the authors and have generated the law DECRETO 10 November 10 2011 "Technical Rules for the generation, documentation and exchange of digital orthophotos at a nominal scale of 1: 10000";
- The testing of the production of digital orthophotos at the nominal scale of 1: 5000 of the Piedmont Region (notice of over 2 M € for the contractor, about 32 K€ for the activities of Politecnico di Torino) carried out as part of a consultancy agreement with the Politecnico di Torino in collaboration with the Testing Commission composed by, in addition to myself, Sergio Dequal (later replaced by Ambrogio Manzino), Roberto Chiabrandi and Gabriele Garnero.

2.1.2 A²SIFT

The second product is the paper:

[90] Lingua A; Marenchino D; Nex F, (2009) *Performance analysis of the SIFT operator for automatic feature extraction and matching in Photogrammetric Applications*, **SENSORS**, mdpi, pp. 22, 2009, Vol. 9, ISSN: 1424-8220, DOI: 10.3390/s90503745.

The research starts from the requirements of the emerging photogrammetric technologies (mobile mapping system, oblique images, unmanned aerial vehicles, UAVs) that require the use of feature extraction/matching algorithms from different images in a more effective way respect the interest operators used until a few years before. This algorithms have been proposed in numerous scientific papers in the context of computer vision and robotics with the convergent images geometry such SIFT (Scale-invariant feature transform, proposed by Lowe, 1999) or SURF (speeded up robust features offered by Bay , 2006).

The product reported uses this consideration to verify the SIFT operator performance for the automatic feature extraction/matching between different images from the photogrammetric point of view (accuracy and completeness, the first aspect of innovation) by comparing their results with the techniques used so far in the field of photogrammetry (the operator of interest Forstner, the Cross Correlation and Least Squares Matching) in 3 operative scenarios:

- aerial photography taken with normal and digital camera Z/I DMC;
- close range photogrammetry with converging images;
- photogrammetry from Unmanned Aerial Vehicle (UAV, second aspect of innovation).

To solve some problems of SIFT operator in particular in the case of images with too homogeneous texture, the authors have proposed an auto-adaptive evolution of SIFT (Auto-Adptive SIFT, A²SIFT, third aspect of innovation) that would allow to:

- identify low texture areas;
- locally define the best initial parameters of SIFT operator in order to improve the number of extracted features.

This new algorithm has been verified in the practical application of images acquired by UAV.

My contribution to the work of the study, which can be considered equal with respect to other authors, is related to:

- use of an original implementation of Forstner operator developed for my PhD thesis in Fortran language;
- application of the software tool to automatically resolve a symmetrical relative orientation using a robust tecnique (LMS, Least Median Square) developed in

Fortran language as evolution of the algorithm presented at the ISPRS Congress of 2000 ([169]);

- the definition of comparison scenarios and the parameters to be used for comparing the various algorithms;
- collaboration with other authors in the definition of the modified algorithm (A²SIFT).

The contribution had, for the common numbers in the field of geomatics, a good international relevance obtaining:

- 5th place in the Best Paper Award 2013 of SENSORS journal;
- numerous citations: 89 seconds Scopus (80 without self-citations), 119 seconds Google Scholar (over 90 without self-citations).

The algorithm A²SIFT allowed to start a useful activity related to images navigation as described in the papers [85], [84], [76], [63] and the research agreement with Magneti Marelli (an FCA company) that I'm still developing in collaboration with the principal investigator (Marco Piras, about 50 K€).

2.1.3 **Image Recognition Based Positioning (IRBP)**

The third proposed product is:

[44] Lingua, A.; Aicardi, I.; Ghinamo, G.; Corbi, C.; Francini, G.; Lepsoy, S.; Lovisolo, P. (2014) *The MPEG7 Visual Search Solution for image recognition based positioning using 3D models*. In: **proceedings of 27th International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS+)**, pp.2078-2088, WOS:000356331203003, Scopus: 2-s2.0-84939244216

The need to always know our position is a essential request, in recent years, since the development of Location Based Services (LBS), the Smart Cities, the tourism aid systems and techniques for augmented reality. The techniques of navigation in outdoor environment are well known and widely analyzed in scientific bibliography, in particular for GNSS based solutions using receivers for real-time positioning (meter accuracy) or high precision location (centimeter).

These systems doesn't work well, in some situations:

- urban canyons where the GNSS position in real time is not accurate (10-20-50 m);
- indoor applications where the GNSS location is not available;
- augmented reality applications or other specialized LBS in indoor environment that often require knowledge even of attitude orientation parameters to a correct definition of user's smartphone position.

In these situations, the use of innovative techniques is needed to get the location of a smartphone and its angular attitude: the solution proposed by the authors reported in the product permits to resolve this problem using a localization solution based on images (image recognition based location, IRBL).

The innovative solution proposed by the authors is based on:

- a visual database of the object area consists of thousands of solid images (RGB + range for each pixel) at a known location/angular attitude. This database can also be generated by a terrestrial LiDAR techniques based on colored point clouds which allows the generation of synthetic solid images;
- a visual search procedure based on compact global descriptors (Compact Descriptors Visual Search, CDVS), a Telecom patent that allows , very quickly, to locate inside images database the most similar image (reference image) to one taken by the user (user image) and transmitted to a specific server for calculation;

- features extraction/matching using SIFT between the user image and the reference image to estimate the fundamental matrix using RANSAC to detect the correct common features;
- transformation of the feature in 3D feature thanks to the solid image 3D contents;
- solution of a linear system of DLT (Direct Linear Transformation) equations to define the approximation of external orientation parameters;
- iterative solution of nonlinear system of collinearity equations to determine external orientation parameters of user image with high precision.

My contribution to this research is related to:

- the development of the software ("ScanToSolidImage") in Fortran language that generates synthetic solid images from colored point clouds;
- the definition of the IRBL algorithm, excluding CDVS patent to which I have not worked;
- collaboration with Giorgio Ghinamo for the development of software prototype in MATLAB environment for IRBL algorithm after the reference image extraction (CDVS solution);
- In cooperation with other authors, the construction of the experimental database on which to apply the procedure in order to test its effectiveness. Correct solutions have been obtained with the apparatus "Butterfly" and a traditional topographical high-precision network that allows the measurement of the position and angular attitude of the images captured by a smartphone for the comparison of the proposed algorithm results;
- production of a set of experimental results useful to evaluate the accuracy of the method.

The impact of this recent product can be evaluated by:

- Citations: 8 in Google Scholar (3 without self-citations), 6 in Scopus database;
- The developments that has followed this product in urban canyons application and towards integrated hybrid solution navigation between images and inertial sensors embedded in smartphones contained in the contributions ([18], [32], [34]).

These contributions have allowed me to be considered an expert in the subject as evidenced by the following activities:

- a research agreement signed in 2014 with TELECOM Italy entitled "*Algorithms and procedures for localization through images in indoor and outdoor environment*", one year, funding of about 25 K€;
- a research agreement signed in 2015 with TELECOM Italy entitled "*Image based navigation via smartphones*", duration 1.5 years, funding of about 35 K€;
- the recent patent application in the first instance (report in title, carried out with TELECOM Italy related to some additional features of the system for the optimization of the final solution);
- following the presentation of the work at the 27th International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS +), it was entered into 2 research agreement between my research group of DIATI - Politecnico di Torino (of which I am the principal investigator) with the area of Positioning / Navigation Technology of ETRI (Electronic and Telecommunications Research Institute), one of the leading research centers in South Korea. The objective is the technology transfer activities related to the proposed algorithm IRBL with a specific application at the "Bangbae" subway station in Seoul. The funding is about 190 K€ for 18 months of activities;

2.1.4 The Square Kilometers Array (SKA) project

The Square Kilometer Array project (SKA) is a global project of science and engineering that aims to build the biggest network of radio telescopes in the world bringing together some of the most brilliant scientists of the planet. When completed, the SKA will be a network of many small antennas that will cover the collection of data over an area of 1 km² of ground surface, a large field of view, with examples that extend throughout the world for some thousands of kilometers, and technologies innovative for receivers, transport and signal processing and calculation.

I had the opportunity to be included in the project by the Institute of Astrophysics (INAF-IRA National Radio Astronomy Institute) for the characterization problem of individual antennas or antenna array through the use of a drone on which is mounted a radio transmitter (made by CNR-IEIIT Torino) who must fly along pre-determined trajectories. This project is configured as a multi-disciplinary activities where geomatics plays an important role.

The contributions reported on this issue are:

- [53] Virone G.; Lingua A.M.; Piras M.; Cina A.; Perini F.; Monari J.; Paonessa F.; Peverini O.; Addamo G.; Tascone R. (2014) *Antenna Pattern Verification System Based on a Micro Unmanned Aerial Vehicle (UAV)* In **IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS**, ISSN:1536-1225 vol. 13, DOI:10.1109/LAWP.2014.2298250. pp.169-172.

Citations: 39 Scopus, 55 in Google scholar

My contribution is related to: the cooperation in the first design of the system (proposed to the SKA board), the definition of flight paths using appropriate self-made MATLAB tools, the stake-out operation and surveying of the receiving antenna, the system definition for the automatic tracking of the drone by a motorized total station in order to determine the position of the transmitter with high accuracy respect to the ground antenna, the synchronization technique of the electromagnetic measurements with topographic observations.

- [23] G. Pupillo, G. Naldi, G. Bianchi, A. Mattana, J. Monari, F. Perini, M. Poloni, M. Schiaffino, P. Bolli, A. Lingua, I. Aicardi, H. Bendea, P. Maschio, M. Piras, G. Virone, F. Paonessa, Z. Farooqui, A. Tibaldi, G. Addamo, O.A. Peverini, R. Tascone, S.J. Wijnholds (2015) *Medicina array demonstrator: calibration and radiation pattern characterization using a UAV-mounted radio-frequency source*. In: **EXPERIMENTAL ASTRONOMY**, pp. 1-17. - ISSN 0922-6435]

Citations: 20 Scopus, 27 Google Scholar

My contribution is related to: the procedures for measuring the position of the drone using dual frequency multi-constellation geodetic receiver mounted on board with patch antenna, the definition of flight strategies to allow a correct solution of the trajectory (ambiguity fixing), the development of MATLAB software for the definition of flight paths, the operations of definition of the position of the antennas by means of high precision topographic techniques.

- [17] Bolli, P.; Pupillo, G.; Virone, G.; Farooqui, M. Z.; Lingua, A.; Mattana, A.; Monari, J.; Murgia, M.; Naldi, G.; Paonessa, F.; Perini, F.; Pluchino, S.; Rusticelli, S.; Schiaffino, M.; Schillirò, F.; Tartarini, G.; Tibaldi, A. (2016) *From MAD to SAD: The Italian experience for the Low Frequency Aperture Array of SKA1-LOW*. In: **RADIO SCIENCE**, ed. American Geophysical Union, ISSN:0048-6604, vol. 51 (3), pp. 160-175, doi: 10.1002/2015RS005922

Citations: 7 in Scopus, 11 in Scholar. The contribution has had for its quality and international interest in the **cover of volume 51, issue 3 of the journal Radio Science**.

My activities is related to: the evolution of flight strategies, the definition of the position of the antenna using precision photogrammetric techniques based on drone, the software configuration for a rapid "in field" post-processing.

2.1.5 Photogrammetry from Unmanned Aerial Vehicle

[70] F. Rinaudo, F. Chiabrando, A. Lingua , A.T. Spanò, (2012) Archaeological site monitoring: UAV photogrammetry can be an answer, **INTERNATIONAL ARCHIVES OF THE PHOTOGRAFMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, ISPRS Council, pp. 6, 2012, Vol. XXXIX, ISSN: 1682-1750

Citations: 15 Scopus (14 without self-citations), 32 Google Scholar (28 without self-citations)

The contributions of the authors are substantially equal. I was done in particular: the phases of acquisition in the field of photogrammetric blocks using an hexacopter home-made (the first photogrammetric flight with multi-copter on real case acquired from Geomatics group of Politecnico di Torino), the orthophoto processing and the generation of solid orthophotos included in STOPviewer freeware software.

[57] Chiabrando F., Lingua A., Piras M. (2013) Direct photogrammetry using UAV: tests and first results, In: **INTERNATIONAL ARCHIVES OF THE PHOTOGRAFMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, Volume XL-1/W2, 2013, G. Grenzdörffer and R. Bill, UAV-g2013, Rostock 4–6 September 2013, Vol. XL-1/W2, ISSN: 2194-9034, pp. 81-86,

Citations: 12 Scopus, 19 Google Scholar

This paper was born by my original idea to use for generating mapping information from drone the direct photogrammetry techniques applied to data acquired by the sensors that the drone used for real time navigation, considering the closeness between the digital camera and the object. My activities are related to: the photogrammetric flight planning and their implementation on the ground, the problem of synchronization in order to put together the navigation parameters of the drone with the external orientation parameters of frame estimated by bundle block adjustment, the analysis of results of various cases .

[24] P. Boccardo, F. Chiabrando, F. Dutto, F. G. Tonolo, A. Lingua (2015) UAV Deployment Exercise for Mapping Purposes: Evaluation of Emergency Response Applications, **SENSORS**, 15(7), 15717-15737; doi:10.3390/s150715717

Citations: 22 Scopus, 38 Google Scholar

This paper demonstrates through a series of practical applications in the field that the drones can be used profitably for early impact applications. The contributions of the authors were substantially equal. In particular, I am involved to: study the various operational scenarios for testing, plan flights of multi-copter, survey the Ground Control Point and support and collaborate in the interpretation of results.

2.1.6 True ortofoto and further developments

[127] Biasion A.; Dequal S.; Lingua A., (2004) A new procedure for the automatic production of true orthophotos, In: **INTERNATIONAL ARCHIVES OF THE PHOTOGRAFMETRY AND REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, Volume XXXV Part B4, Istanbul 12-23/07/2004, 2004

Citations: paper not yet present in Scopus, 31 for Google Scholar

My contributions are: the implementation of the developments of the software ACCORTHO in Visual Fortran language to make it usable in urban applications, the realization of the GeneDDSM software for the generation of a Dense Digital Surface Model from a 3D digital map, the proposal of innovative Solid True OrthoPhoto (STOP) and the development of the freeware software tool STOPviewer in Visual Fortran environment with GINO libraries.

[94] Brovelli M; Crespi M; Cillocu F; Dequal S; Lingua A.M., (2009) *Ortoimmagini 1:10000 e modelli altimetrici - Linee guida*, **CISIS (ITA)**, pp. 68, 2009, monografia, Vol. unico, ISBN: 9788885386976

Citations: paper not yet present in Scopus because it is a monograph book, 3 for Google Scholar

The importance of the book is relevant for Italy as they are guidelines that all regions are invited to follow in the generation of orthophotos and DTM/DSM. The contributions of the various authors were substantially equal. My contribution is related to: the definition of the characteristics of the various levels of DTM/DSM, the description of methods of generation of DTM/DSM using photogrammetry and interpolation from existing digital maps, the characteristics in terms of quality of 10k orthophotos, the procedural specification for the production of orthophotos by means of aerial photography, the testing procedures. I am also the author of the first writing of the glossary.

- [83] Lingua A., Nex F., Rinaudo F., (2010) *Integration of airborne laser scanner and multi-image techniques for map production*, **Proceedings of Spie**, The International Society For Optical Engineering, pp. 14, 2010, Vol. 7831, ISSN: 0277-786X

Citations: 3 Scopus (3 without self-citation), 5 Google Scholar

My contribution was equal than the other authors, collaborating in the definition of the original procedure and specifying the method of results verification.

- [56] Forno M.G., Lingua A., Lo Russo S., Taddia G., Piras M. (2013) GSTOP: a new tool for 3D geomorphological survey and mapping , **EUROPEAN JOURNAL OF REMOTE SENSING**, Davide Travaglini, pp. 16, 2013, Vol. 46, ISSN: 2279-7254, DOI: 10.5721/EuJRS20134613

Citations: 7 Scopus, 8 Google Scholar

My contribution is related to: the development in Visual Fortran language using graphics libraries GINO routines of the software tools GSTOPviewer with the implementation of the connection with position/attitude sensors, the realization of a prototype solution of position/attitude sensors extracted from an UAV. I collaborated also on the construction of Solid True OrthoPhoto used for geomorphological survey on the field in Rodoretto area (TO).

2.1.7 **Indoor e outdoor positioning, navigation and dynamic surveying**

- [102] Cina A.; Lingua A.M.; Piras M., (2008) *Low cost mobile mapping systems: an Italian experience*, **2008 IEEE/ION Position Location and Navigation Symposium**, Monterey, California May 5-8, 2008, pp. 13, 2008, ISBN: 9781424415373

Citations: 15 Scopus, 23 Google Scholar

The contributions of various authors were substantially equal. My activities are related to: the collaboration of the design of the system, the calibration of the photogrammetric camera, the system calibration procedure with definition of transformations between different coordinate systems, the development of LCMMS software (Visual Fortran with GINO graphics libraries procedure) that allows to view various video images acquired and perform simple local/georeferenced measurements on the road by inserting appropriate feature code.

- [76] De Agostino M., Lingua A., Marenchino D., Nex F., Piras M., (2011) *GIMPHI: a new integration approach for early impact assessment*, **APPLIED GEOMATICS**, Springer, pp. 9, 2011, Vol. 3, ISSN: 1866-9298, DOI: 10.1007/s12518-011-0069-6

Citations: 8 Scopus, 8 Google Scholar

The contributions of the various authors were substantially equal. This paper comes from a my idea of the end of 2009 in which, starting from the studies carried out on the algorithm A²SIFT, I proposed other authors to investigate the possibility of using images captured by our low cost MMS to improve the performance of inertial sensors installed in post-processing phase. My contribution is related to the

improvement of robust LMS (Least Median Squares) technique of automatic relative orientation procedure in order to extract a robust set of tie points along video sequences, the development of a procedure for Bundle Block Adjustment integrated with the observations derived from the GNSS receiver and the IMU sensor that provide the approximate data and the relative accuracy with which to define a correct weight, the selection strategy of tie points in order to limit the total number through windowing on the image plane.

- [49] Piras M., Lingua A., Dabove P. (2014). *Indoor Navigation Using Smartphone Technology: a future challenge or an actual possibility?*. In: **Proceedings of Navigation Symposium 2014 IEEE/ION position, location and navigation symposium** - ISBN:9781479933204 vol. CFP14PLN-ART, DOI:10.1109/PLANS.2014.6851509. pp.1343-1352

Citations: 12 Scopus, 15 Google Scholar

The contributions of the various authors were substantially equal. My contribution is related to: the photogrammetric calibration of digital cameras of used smartphones, the definition of the procedure of testing strategies, the use of GIMPHI procedure applied to video captured via smartphone, the definition of the final evaluations.

- [32] Dabove, P.; Ghinamo G.; Lingua A. M., (2015) *Inertial sensors for smartphones navigation*. In: DOI:10.1186/s40064-015-1572-8. pp.1-18. In **SPRINGERPLUS**, ISSN:2193-1801 vol. 4

Citations: 8 Scopus (1 without self-citation), 9 Google Scholar

The contributions of the various authors were substantially equal. My contribution is related to: the definition of the navigation procedure, the experimental task scheduling, the construction of the experimental tests, the validation of the results.

2.1.8 Other multidisciplinary issues

- [66] De Agostino M., Lingua A., Piras M., (2012) *Rock face surveys using a LiDAR MMS*, **RIVISTA ITALIANA DI TELERILEVAMENTO**, AIT, pp. 11, 2012, Vol. 44, ISSN: 1129-8596, DOI: 10.5721/ItJRS201244111

Citations: 5 Scopus, 7 Google Scholar

The contribution of the various authors were substantially equal. My contribution is related to: the innovative technical definition of procedure which uses an integration between LiDAR and GNSS and IMU in stop-and-go way to allow high density data rapidly acquired on the rock face without the need of ground control points, the calibration of the system by defining the roto-translations between systems using specifically on site developed network.

- [100] Lingua A; Piatti D; Rinaudo F., (2008) *Remote monitoring of a landslide using an integration of GB-INSAR and LiDAR techniques*, **INTERNATIONAL ARCHIVES OF THE PHOTOGRAVIMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES**, 2008, Vol. XXXVII/B1, ISSN: 1682-1750

Citations: not included in Scopus, 20 Google Scholar

The contributions of the various authors were substantially equal. My contribution is related to: the planning of research and the initial idea to integrate the GB-InSAR observations with a LiDAR model, the identification of the case study, the collaboration during the phases of acquisition and processing of the acquired data.

- [30] Ronzino A.; Osello A.; Patti E.; Bottaccioli L.; Danna C.; Lingua A.; Acquaviva A.; Macii E.; Grosso M.; Messina G.; Rasconà G. (2015) *The energy efficiency management at urban scale by means of integrated modelling*. In: **Energy Procedia** vol. 83, pp.258-268, DOI:10.1016/j.egypro.2015.12.180

Citations: nessuna citazione in Scopus, 5 Google Scholar

The contributions of the various authors were substantially equal. My contribution is related to: the design of procedures for the automatic acquisition of geometrical data of the building roofs through photogrammetric techniques based on the open-source software MICMAC, the establishment of the terms of comparison between the two solution (automatic and manual) in terms of geometry (accuracy), completeness and energy aspects.

- [42] Aicardi I., Boccardo P., Chiabrandi F., Facello A., Gnavi L., Lingua A., Pasquale F., Maschio P., Spanò A. (2014). *A didactic project for landscape heritage mapping in post-disaster management*. **APPLIED GEOMATICS**, ISSN:1866-9298,. DOI 10.1007/s12518-014-0144-x 1- 12.

Citations: 3 Scopus, 4 Google Scholar

This work is related to one of the first activities of student teams DIRECT and POLICYCLE that I manage with colleagues prof.ssa Nannina Spanò, prof. Piero Boccardo, prof. Marco Piras. The contributions of the various authors were substantially equal. My contribution is related to: the planning of educational activities to be carried out in the field, the collaboration during acquisition phase with practical field exercises, the assistance of the students in the process of data processing and structuring in GIS form.

- [99] Agosto E.; Ajmar A.; Boccardo P.; Giulio Tonolo F.; Lingua A., (2008) *Crime Scene Reconstruction Using a Fully Geomatic Approach.*, **SENSORS**, MDP International, pp. 23, 2008, Vol. 8, ISSN: 1424-8220, DOI: 10.3390/S8106280

Citations: 10 Scopus, 24 Google Scholar

The contributions of the various authors were substantially equal. My contribution is related: to: the cooperation in the definition of the innovative procedure for the reconstruction of the crime scene, the original proposal of metric use of the photographic images captured by the police using a rigorous calibration based on parallelism between the lines of tiles and a sequent rectification on the floor plan, the implementation of this procedure in a software tool developed in Visual Fortran language with the graphics libraries GINO routines, the definition of the statistical analysis procedure of the walk. Today the software for calibration and rectification using parallel lines is converted in a freeware tool (Calibrated Rectification Software, CRS) and it is used in some courses at the Politecnico di Torino. CRS can be downloaded from the website of the laboratory of photogrammetry, geomatics and GIS (http://areeweb.polito.it/geomatics_lab).

- [33] Lingua A.; F. Noardo. (2015) *A Semantic Geodatabase for Environment Analysis - Extraction, Management and Sharing of Earth and Water Information in GIS.. In Proceedings of the 1st International Conference on Geographical Information Systems Theory, Applications and Management (GISTAM-2015)*, ISBN:9789897580994, DOI: 10.5220/0005379002130220, pp.213-220

Citazioni: 0 Scopus, 0 Google Scholar

The paper consists of a preliminary study to address the most innovative aspects within the data structures that are called digital ontologies. The great innovation is not yet introduced in the modern GIS software and then the practical use is difficult. The contribution of the various authors were substantially equal. My contribution is related: the definition of a solution of problems related to geodetic reference system and map projection in the cross-border context and of the basic GIS design.

2.1.9 Some considerations on the impact of my scientific contributions

Figure 1 shows the trend of citations (excluding self-citations) that I received for my papers in the data base Scopus. You can note:

- a substantially upward trend that shows an increasing impact in the scientific studies of the research which I proposed and/or in which I have been involved;
- a maximum of 146 citations in 2017;
- in 2018 the number of citations is obviously lower for the temporal proximity issues with newer and innovative studies;
- my *autor h-index* is equal to 10 and also shows an upward trend.

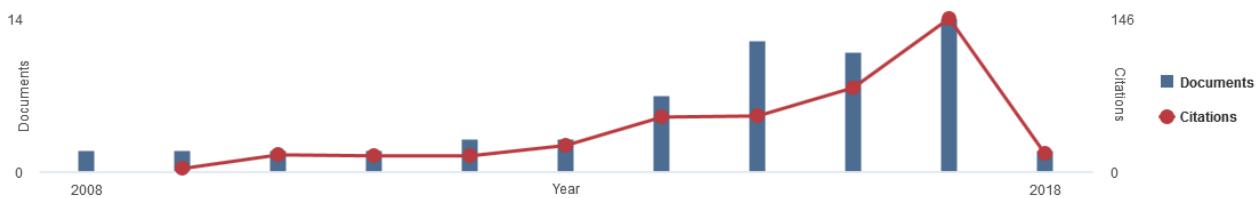


Figure 1- The graph of citations of my papers indexed in SCOPUS in the last years

2.2 Coordination of research and technology transfer groups and projects.

I am in charge of the Laboratory of Photogrammetry, Geomatics and GIS at DIATI - Politecnico di Torino. In this role and on issues related to the laboratory I created (under the approval of Ambrogio Manzino) a research group (*DIATI Geomatics Group*) that I'm coordinating from some years. This group is composed by:

- 2 associate professors (Andrea Lingua, Marco Piras);
- 2 researcher (Paolo Dabone of my department and Filiberto Chiabrandi of Architecture and Design Department, DAD);
- 1 technical photogrammetrist (Paolo Maschio);
- 1 technical surveyor (Horea Bendea) in the form of project work, financed and coordinated in collaboration with other colleagues from the Geomatics Group of DIATI;
- 2 research fellow ("assegnisti di ricerca") for post-PhD position (Noardo Francesca, Antonella Mastropaoalo) of which I am currently tutor. In the past years I were be tutor of following research fellow: 3 years for Filiberto Chiabrandi (post doctorate, with six months financed by the department DAD), 1 year for Simone Balbo (post PhD and Paolo Dabone post PhD), 1 year for Paul Dabone (post PhD), 5 years for Francesca Noardo (during PhD course), 2 years for Irene Aicardi (post-graduate)
- 3 students of current PhD course (Di Pietra Vincenzo, Maria Angela Musci, Francesca MAtrone) of which I am tutor. Recently I was the tutor of 4 doctoral students (Francesca Noardo, Andrea Biasion, Eros Agosto, Irene Aicardi) and co-tutor of 2 PhD students (Davide Marenchino, Francesco Nex);
- 3 fellows post-graduate (Maria Angela Musci, Nives Grasso for the doctoral PhD course, in collaboration with Marco Piras). Recently we were financed 3 scholarships for one year (Chiara Danna, Nives Grasso, Stefano Angeli);
- many trainees ("tirocinanti", Fabiola Viola, Manuel Cazzola, Albana Dervishi, Chiara Tosti, Stefania, Federica Noardo, Mariangela Musci, Marco Costabello, Elena Piovano, Francesca Sileci, ...).

The group was formed in a stable manner for the past two years by about 15 people.

Our collaborations are related to the research projects financed (see specific paragraph) including these main international collaborations:

- United Kingdom:

- University of Cambridge - Department of Physics - Cavendish Laboratory, observatory Mullard (as part of the SKA project, see letter of invitation);
 - EFPConsulting- European Framework Program Consulting Ltd. (AF3 project);
 - The University of Westminster (AF3 project);
- Holland:
 - ASTRON, Dwingeloo radio telescope LOFAR array and in Exloo (letter of invitation)
 - University of Twente, ITC, Faculty of Geo-Information Science and Earth Observation, Enschede;
- - South Korea:
 - Electronic and Communications Research Institute, Indoor Positioning Group, Seoul and Daejeon (in the context of international research agreement, invitation letter);
- - Spain:
 - the Universidad Politecnica, Escuela Tecnica Superior de Ingenieros Agronomos Madrid (endorsement letter for collaboration on National research project);
 - University of Jaén - Departamento de Ingenieria Cartographic, geodesic y Fotogrammetria (endorsement letter for collaboration on National research project);
 - Pyro Fire Extinction (AF3 project);
 - The Universidad Politécnica de Valencia (UPV) (AF3 project);
 - TRAGSA (AF3 project);
- Sweden:
 - Linköping University (AF3 project);
- - Germany:
 - Bochum University of Applied Sciences, Department of surveying and geomatics, Laboratory of Photogrammetry (endorsement letter for collaboration on National research project)
 - Technische Universität Berlin –TUB (DG ECHO Rescult);
 - The Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut – EMI (AF3 project);
 - The Fraunhofer Institute – ICT (AF3 project);
- Greece:
 - INTRACOM TELECOM (AF3 project);
 - The National Centre for Scientific Research “Demokritos” -NCSR (AF3 project);
 - The Hellenic Ministry of Defence (MOD) (AF3 project);
- - Turkey:
 - survey of Hierapolis archaeological site, along with Spanò and Chiabrando of the Architecture and Design Department (DAD);

- - France:
 - o Institut national de l'information géographique et forestière (IGN) - laboratoire "Méthodes d'Analyses pour le Traitement d'Images et la Stéréorestitution" (MATIS) – Paris;
 - o Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture (IRSTEA) – Grenoble (Alpine Space Newfor),
 - o SDIS (Service départemental d'incendie et de secours) - Alpes de Haute-Provence 04 - Digne Les Bains (DG ECHO Rescult);
 - o AIRBUS Defence & Space (AF3 project);
 - o ARIA Technologies SA (AF3 project);
 - o Métropole Nice Côte-d'Azur (NCA) (ALIRHYS ALCOTRA project);
- - Switzerland:
 - o The United Nation Office for Disaster Risk Reduction (UNISDR) also part of the projects Xteam and DG ECHO Rescult;
- Israel:
 - o Elbit System Ltd (AF3 project);
 - o The Ministry of Public Security (AF3 project);
- Ireland:
 - o Skytek (AF3 project);
- Poland:
 - o The Space ReseCBKarch Centre of the Polish Academy of Sciences (SRC PAS) (AF3 project)
- Italy:
 - o The Ministry of Interior – Department of Fire Corps, Public Rescue and Civil Defence (AF3 project);
 - o Selex ES, a Finmeccanica compay (AF3 project);
 - o National Research Center – Institute of Electronic, Informatics and Telecommunication “Centro Nazionale delle Ricerche – Istituto di Elettronica, di Ingegneria dell'Informazione e delle Telecomunicazioni” (CNR-IEIIT), Torino (associate, a research agreement);
 - o National Research Center-Institute of Environmental Geology and Geoengineering “Centro Nazionale delle Ricerche – Istituto di Geologia Ambientale e Geoingegneria” (CNR-IGAG), Torino (associate, endorsement letters);
 - o “Istituto di Radio Astronomia, Istituto Nazionale di AstroFisica” -IRA-INAF (associate, 2 research agreement);
 - o Centro interregionale per le Informazioni Territoriali, CISIS (contratti di ricerca);
 - o local governments (some research agreement with Regione Piemonte, Regione Valle d'Aosta, Provincia di Cuneo, provincia VCO, Arpa Piemonte, Municipality of Mondovì, Mountain authority of valli Po, Bronda e Infernotto...);
 - o Telecom Italia (2 research agreement);

- Magneti Marelli (a research agreement);
- Fiocchi Munizioni (a research agreement);
- Filippetti S.p.A. (IDEM project);
- ACS srl (IDEM project);
- CSP – Innovation in ICT scarl (IDEM project);
- Gaia srl (IDEM project);
- Sia srl (IDEM project);
- FAI service (research agreement).

They are in place for PhD students exchange activities with the University of Twente and Finnish Geodetic Institute of the National Land Survey Institute.

In the past, the research group coordinated by me has worked with the spinoff SIR ("Soluzioni innovative per il rilevamento") in which I managed the activities of 5 people all PhDs positions (Leandro Bornaz, Andrea Biasion, Eros Agosto, Paul Ardisson, Fabio Dago). In this context I also funded a research grant for 2 years Fabio Dago (Protein project) and collaborated with some international activities including:

- Three-dimensional surveying using terrestrial laser scanner and generation of solid images for analysis of the stability of rock face along the highway in the area IPOH (Malaysia)
- Generation of three-dimensional model in the form of solid images acquired by terrestrial long range LiDAR for the analysis of the stability of the rock walls in Gondo (Switzerland);
- Innovative solutions for three-dimensional detection using terrestrial LiDAR and generation of solid image database of the Algiers metro (Morocco).
- 3D Survey using terrestrial LiDAR techniques and Solid Images for rock face stability analysis in IPOH (Malaysia)
- Innovative solution of 3D LiDAR survey and Solid Images Database for the subway of Algeri (Maroc).

2.3 Scientific Projects

2.3.1 **Scientific responsibility (Principal Investigator) of competitive National and International research projects, awarded through a peer-review process.**

- Research project of national relevance funded from Italian Ministry of University and Research, PRIN 2010-2011 "Tecniche geomatiche innovative ed emergenti di rilievo, telerilevamento (da aereo, satellite, UAV) e webGIS per la mappatura del rischio in tempo reale e la prevenzione del danno ambientale"

I am the principal Investigator for local unit of Politecnico di Torino
funding: about 135 k€ in 3 anni (2013-2016)

- European research project: ALCOTRA 2007-2013 "Alpi Latine – Identificazione delle Risorse HYdriques Sotterranee" (ALIRHYS)

I am the principal Investigator for the geomatics topic of Politecnico di Torino
funding: about 80 k€ in 2 anni (2013-2015)
(<http://areeweb.polito.it/ricerca/ALIRHYS/progetto/>)

- European research project POR FESR di Regione Piemonte "IDEM, Internet of Data for Environmental Monitoring"

I am the principal Investigator for local unit of S3+lab of Politecnico di Torino
funding: about 180 k€ in 1 anno (2014-2015)
(<http://www.progettoidem.com/progetto/>)

- European research project DG ECHO “*RESCULT: Increasing Resilience of Cultural heritage: a supporting decision tool for the safeguarding of cultural assets*”
I am the principal Investigator for local unit of Politecnico di Torino
Funding: about 180 k€ in 2 anno (2017-2018)
(<https://www.rescult-project.eu/>)
- Research project of national relevance funded from Italian Ministry of University and Research, SMART CITIES, COMMUNITIES AND SOCIAL INNOVATION “*SMARTOUR intelligent platform for tourisms*”
I am the Scientific Manager of the whole project
Funding: about 9000 k€ in 2 anno (2018)

2.3.2 Participation of research project with national/international relevance

- Progetto europeo INTERREG HELIDEM “*HELvetia-Italy Digital Elevation Model*”
Principal Investigator for local unit of Politecnico di Torino Prof. Ambrogio Manzino
Periodo: 2012-2014 (<http://helidem.eu/>)
- European project FP7: “*AF3 - Advanced Forest Fire Fighting*” : Collaborative Project (CP) – Large scale integrating project (IP). Topic SEC-2013.4.1-6 Preparedness for and management of large scale forest fires - Integration Project
Principal Investigator for local unit of Politecnico di Torino Prof. Emilio Paolucci
years: from 2014 to 2017 (<http://af3project.eu/>)
- Research project of national relevance funded from Italian Ministry of University and Research, PRIN “*Use of high resolution satellite images for territorial analysis*”
Principal Investigator at national level Prof. Sergio Dequal
Years: 2001-2002
- Research project of national relevance funded from Italian Ministry of University and Research, “*Laser scanning acquisitions for the production of digital models for 3D digital map and true orthophotos*”
Principal Investigator at national level prof. R. Galetto
Years 1998-1999
- Research project of national relevance funded from Agenzia Spaziale Italiana (ASI, Spatial Italian Agency) “*High precision measurements and methods of spatial geodesy*”
Principal Investigator for Politecnico di Torino Prof. Ambrogio Manzino
Years 1999-2004
- Research project of national relevance funded from Italian Ministry of University and Research, “*Digital methods of surveying, GIS and multimedia network for Architectonic/Environmental Heritage*”
Principal Investigator at national level prof. C. Monti
Principal Investigator for local unit of Politecnico di Torino prof. Sergio Dequal
Years 2000-2001
- Research project of national relevance funded from Italian Ministry of University and Research, “*Integration of survey techniques on GIS for recording, conservation and management of Cultural Heritage*”

Principal Investigator at national level prof. C. Monti
Principal Investigator for local unit of Politecnico di Torino prof. Fulvio Rinaudo
Years 2002-2003

- Reserch project of national relevance funded from Italian Ministry of University and Research, "*Innovative techniques for forecast, management and mitigation of environmental emergencies*"
Principal Investigator at national level prof. Sergio Dequal
Years 2003-2004
- Reserch project of national relevance funded from Italian Ministry of University and Research, "*Analysis, comparing and integration of images acquired by aerial and satellite platforms*"
Principal Investigator at national level prof. Sergio Dequal
Years 2006-2007
- Reserch project of national relevance funded from Italian Ministry of University and Research, "*MAPPER – procedures for acquisition and processing of multisources data for the emergency response*"
Principal Investigator at national level prof. Piero Boccardo
Years 2009-2010
- Reserch project on "Smarcities & Communities" of Italian Ministry of University and Research, topic: Cultural Heritages, "*INTOUR, Intelligent Platform for Tourism*"
Principal Investigator for local unit of Politecnico di Torino prof. Alberto Cina
Time period: the project won the tender in 2014 but have not yet reached the structural funds.

2.3.3 Scientific responsibility of research agreements with national/international relevance

- International research agreement with ETRI, South Korea "*A solution of Image Recognition Based Positioning using database of solid images*"
I am Principal investigator for the Politecnico di Torino.
Funding: about 72 k€ in 6 months (2016)
- Research agreement with TELECOM Italia "*Algorithms and procedures for Image Recognition Based Localisation in indoor/outdoor contexts*"
I am Principal investigator for the Politecnico di Torino.
Funding: about 25 k€ in 1 year (2013-2014)
- Research agreement with TELECOM Italia "*Image based navigation using smartphone*"
I am Principal investigator for the Politecnico di Torino.
Funding: about 35 k€ in 1.5 years (2014-2016)
- Research agreement with IRA-INAF for SKA project "*Geomatics activities on the use of drones for the characterization of antennas for radioastronomy*"
I am Principal investigator for the Politecnico di Torino.
Funding: about 25 k€ in 1 year (2013-2014)
- Research agreement with IRA-INAF for SKA project "*Geomatics and drones for Square Kilometres Array (SKA)*"
I am Principal investigator for the Politecnico di Torino
Funding: about 31 k€ in 1 year (2014-2015)

- Research agreement with CNR-IEIIT nell'ambito di SKA “*Geomatics techniques and use of UAV for the measurements of antenna radiation diagrams of low frequencies antennas array*”
 I am Principal investigator for the Politecnico di Torino.
 Funding: about 25 k€ in 1 year (2015-2016)
- Research agreement with CISIS “*Italian guidelines for the generation of orthophoto and DTM/DSM at large scale*”
 I am Principal investigator for the Politecnico di Torino instead of original retired PI, prof. Sergio Dequal.
 Funding: about 25 k€ in 1.5 year (2010-2011)
- Research agreement with regione Valle d'Aosta “*Scenario definitions of rock fall problems*”
 I am Principal investigator for the geomatics group of Politecnico di Torino.
 Funding for geomatics activities: about 141 k€ in 3 years (2014-2016)
- Research agreement with Fondazione Centro Studi Logistica e Trasporti “*Design and realization of a datawarehouse for statistical analysis of transport and logistics*”
 I am Principal investigator for the Politecnico di Torino.
 Funding: about 10 k€ in 1 year (2014-2015)
- Research agreement with Regione Piemonte “*Quality testing of cartographic product generation for the whole Regione Piemonte*”
 I am Principal investigator for the Politecnico di Torino.
 Funding: about 32 k€ in 2 years (2014-2015)
- Research agreement with ARPA Piemonte “*LiDAR survey from car*”
 I am Principal investigator for the Politecnico di Torino.
 Funding: about 32 k€ in 2 years (2014-2015)
- Research agreement with Fiocchi Munizione spa “*3D survey of bullet trajectories using high- speed videogrammetric techniques*”
 I am Principal investigator for the Politecnico di Torino.
 Funding: about 10 k€ in 2 years (2006)

La Figure 2 shows the funding obtained over the last eight years related to educational activities, research agreements, research projects and verification/consultant for justice. The curves are cumulative except the asterisks curve (total for years) that indicates the structural funds per year.

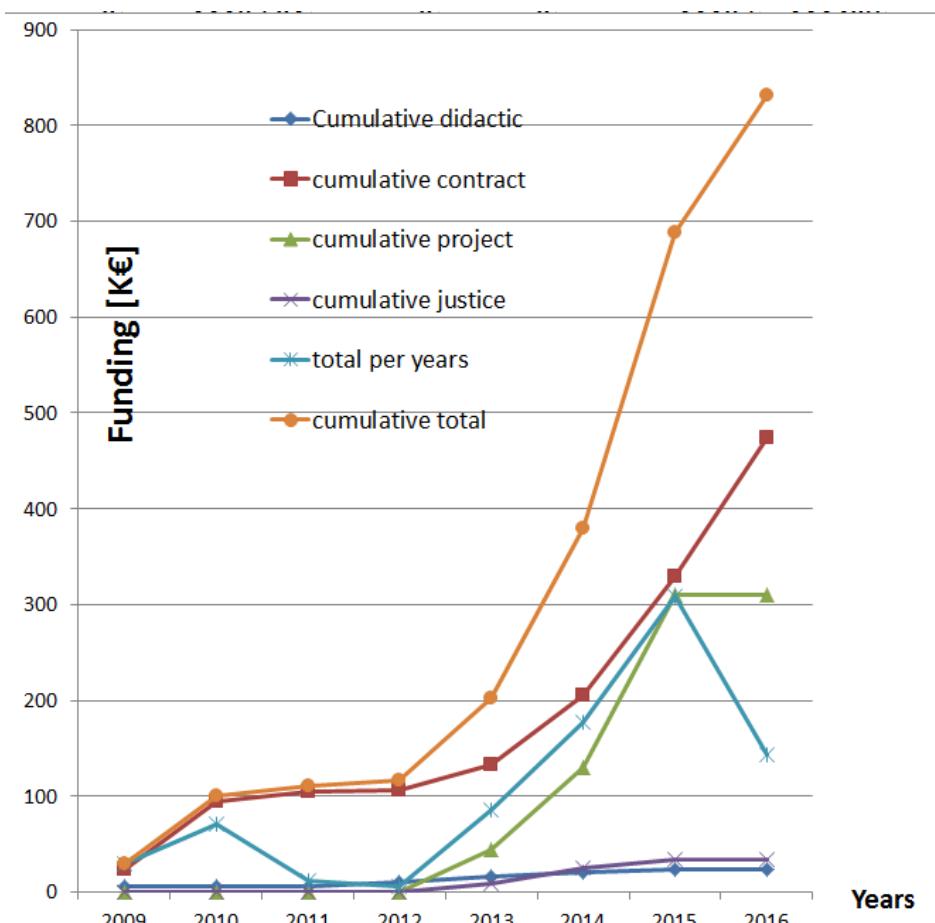


Figure 2- Chart of the funding obtained over the last eight years related to educational activities, research agreements, research projects and verification / consultant for justice. The curves are cumulative except the asterisks curve (total for years) that indicates the structural funds per year.

2.3.4 Outcomes obtained in the field of technology transfer, in terms of participation in start-ups and spin-offs, development, use and commercialization of patents/licenses.

- I was the promoter of the spin-off of the Politecnico di Torino, SIR, Innovative solutions for surveying Ltd.

*The initial idea was devoted to do the technological transfer of two innovative products proposed by the geomatics group of the Politecnico di Torino: **the solid image (SI)** and **the Solid True OrthoPhotos (STOP)**. These two products form a useful result still to properly use the point clouds acquired by laser scanning (aerial/terrestrial) or by photogrammetry and dense matching techniques. In fact, these products can be produced in a substantially automatic way, are not pre-interpreted in the form of a 3D model and then retain throughout the metric /informative original content, can be simple to use even unskilled within the geomatics (restorers, conservators, archaeologists, ...).*

- In the period I were President of SIR srl, we allowed the production of an innovative software (SIRio).

SIRio allowed the generation of SI and STOP in an automatic way and the visualization of them in an effective, complete, without the need for special hardware or the need to special training. This software was also used for many years by the Geomatics Group of Politecnico di Torino for the performance of specific teaching lessons, processing for master thesis and PhD thesis, development of specific research projects (eg. Research agreement with ARPA described in 2.3). Thanks to SIRio have been carried out numerous 3D surveying activities and preparation of three-dimensional

database based on SI or OSP in Italy (Hone-AO, Buronzo - VC, of Vercelli Cathedral, Ipo - Malaysia, Gondo - Switzerland, Algeria - Morocco, ...). SIRio allowed to create in 3 years a company that is self-sustaining and provide work and wages to five members. SIR has been acquired by the company Ad Hoc 3D Solutions in 2007 that continued development of the software now called Ad Hoc.

- Ghinamo G., Lingua A.M. (2016) *System for generating 3D images for image recognition based positioning. First request of International Patent PCT International Application No. PCT/EP2015/081455, Telecom ID: I15042-WO/FC-MM, DTEL14030*

As you can see in the first page of the attached document: "... The patent applications are published after 18 months from the date of first deposit, and then during that period they are secret". The patent is owned by TELECOM property but between the two inventors (me and George Ghinamo) the contribution the proposal was equivalent. International interest in the topic is highlighted in the third product presented (1.1.4), in other publications reported on this issue previously, the interest of ETRI for Technological transfer activities related to the main process (not the one linked to the patent).

2.4 National and international reputation and professional activity for the scientific community

2.4.1 ***Editorship of Journals with international reputation (in the role of Editor in Chief – EIC), editorship of book series, encyclopedias and essays of recognized prestige.***

"Bollettino della Società Italiana di Fotogrammetria e Topografia (SIFET)" ISSN 1721-971X) from 2014 to today (according to the position of President of Scientific Board of SIFET). This journal, published since 1951, was historically the reference journal for the topics of geomatics at national level. While it is not indexed, the Bollettino of SIFET imposes a double blinded revision to guarantee a high scientific contents. The Scientific Committee has been launched this year the demand for indexing Scopus.

2.4.2 ***Participation in the Editorial Board of Journals with international reputation (in the role of Associate Editor or equivalent), participation in the Editorial Board of book series, encyclopedias and essays of recognized prestige.***

Participation of Editorial Board of these journals:

- Bollettino della Società Italiana di Fotogrammetria e Topografia (ISSN 1721-971X) from 2011 to today;
- Applied Geomatics ISSN: 1866-9298 (Print) 1866-928X (Online) editor Springer;

I am reviewer for these journals:

- Sensors;
- Remote Sensing;
- European Journal of Remote Sensing;
- ISPRS Journal of Photogrammetry and Remote Sensing;
- Rock Mechanics and Rock Engineering;
- International Journal of Digital Earth;
- Journal of Cultural Heritage;
- Applied Geomatics.
- Bollettino della Società Italiana di Fotogrammetria e Topografia.

2.4.3 Official research and/or teaching and/or fellowship roles, positions as Scholar/ Visiting Professor in international highly qualified universities and research centres.

ETRI (Electronic and Telecommunications Research Institute) is one of the most important research institutes of South Korea recently named for the third consecutive year in first place in the "US evaluation of patents" (https://www.etri.re.kr/engcon/sub1/sub1_08.etri). As described in 2.3 ETRI recently commissioned research agreement to my geomatics group (I am the principal investigator) for the evaluation of the performance of the algorithm of Image Recognition Based Location using a synthetic solid image database (funding of about 72 K € for 6 month agreement). We are compiling a new research agreement for investigate the use of smartphones for indoor navigation in an attempt to propose a hybrid navigation solution that integrates all sensors available beginning in September and lasting one year (research agreement in title)

ASTRON (<https://www.astron.nl/>) is the Netherlands Institute for Radio Astronomy. Its mission is to make discoveries in radio astronomy happen, via the development of novel and innovative technologies, the operation of world-class radio astronomy facilities, and the pursuit of fundamental astronomical research. As part of the SKA project, I was invited (in April 2016), with geomatics group, at the installation LOFAR (LOw Frequency Array) in Exloo for advanced research related to the characterization of the antenna array (the letter invitation is in the titles).

The University of Cambridge - Cavendish Laboratory (<http://www.phy.cam.ac.uk/>) is English institute which cooperates under the SKA project as regards the characterization of arrays of antennas. I was invited in September 2014, with the geomatics group at the Astronomical Observatory Mullard, near Cambridge, for an advanced research activities related to the characterization of the antenna array system based on the antenna SKALA (invitation letter in title).

2.4.4 Offices in the Governing bodies of national and international scientific societies.

- From 2014, President of Scientific Committee of Italian Society of Photogrammetry and Surveying (*Società Italiana di Fotogrammetria e Topografia, SIFET*) (elective position)
- From 2014, member of Directive Committee of Italian Society of Photogrammetry and Surveying (, *Società Italiana di Fotogrammetria e Topografia, SIFET*) (incarico elettivo)
- From 2014, member of Scientific Committee of Italian Scientific Associationss for Land and Environment (*Associazioni Scientifiche Italiane per il Territorio e l'Ambiente, ASITA*);
- From 2013, member of Working Group V/2 ISPRS “Cultural heritage data acquisition and processing”

2.4.5 Prizes and awards awarded to the candidate for his/her scientific activity and project activity in the Academic Fields (“Settori Concorsuali”), where this is appropriate.

- Best Poster awards for Andrea Lingua and Fulvio Rinaudo “for the excellent poster presentation of the paper *The statue of Ramsete II – Integration of Digital Photogrammetry and Laser Scanning Techniques for 3D Modelling*” (2001);
- Best Poster awards for Sergio Dequal and Andrea Lingua “for the excellent poster presentation of the paper *True Othophoto for Architectural Surveys*” (2001);
- Best Poster awards of VI conferenza nazionale ASITA 2005 for the paper “The Laser scanner data processing for terrestrial application” authors: Bornaz L., Lingua A., Rinaudo F.;

- Best Poster awards of IX conferenza nazionale ASITA 2002 for the paper “Innovative techniques for multispectral survey of frescos” authors: Borgogno Mondino E., Grua M., Lingua A., Giulio Tonolo F.;
- Best Poster awards of VI conferenza nazionale ASITA 2008 for the paper “A new on-line instrument of 3D geometric and radiometric data of territorial survey: the web viewer of Solid True OrthoPhoto” authors: Agosto E., Lingua A., Picco L..
- 5th Prize on Sensors Best Paper Award 2013;
- CCB Paper Awards of Politecnico di Torino, years 2009-2010;
- CCB Paper Awards of Politecnico di Torino, years 2011-2012;

2.4.6 Invited speaker

- Invited speaker for a workshop in ETRI Daejeon in may 2016 with a specific lecture on “*Image Recognition Based Location (IRBL)*” and an invited presentation on “*the adopted solution for the generation of the Synthetic Solid Image database of the Bangbae Subway Station in Seoul*” (2016).
- Invited speaker on “*Innovative instruments for the acquisition of territorial information*” at the international workshop MIMOS 2011 “Virtual Earth Simulation” in L’Aquila (Italy), (2011);
- Invited Speaker on «*Unmanned Aerial Vehicles: state of the art and operative limits*» at SIFET workshop “We adopt our monuments” in Ragusa (Italy), 2015

2.4.7 Member of scientific committees of International Conferences

- Member of Program Committee at 2nd International Conference on Geographical Information Systems Theory, Applications and Management (GISTAM 2016, *certificato nei titoli*);
- Member of Workshop Committee at International Congress FOSS4G Europe 2015;
- Member of Scientific Committee of Internazional Workshop “SIFET-SNPT” (Societè National de Photogrammétrie et Télédétection) at 2016;
- Member of local Committee of XX CIPA Symposium, 2005;
- Member of local directive Committee of SIFET congress 2014;
- Member of Scientific Committee of ASITA congress 2015;
- Member of Scientific Committee of ASITA congress 2016;
- Member of Scientific Committee of ASITA congress 2017;
- Member of Scientific Committee of SIFET congress 2016;
- Member of Scientific Committee of SIFET congress 2015;
- Member of Scientific Committee of SIFET congress 2014;
- Member of Scientific Committee of SIFET congress 2013;
- Member of Scientific Committee of SIFET congress 2012;
- Member of Scientific Committee of SIFET congress 2011;
- Member of Directive Committee of SIFET congress 2015;
- Member of Directive Committee of SIFET congress 2016;
- Member of Directive Committee of SIFET congress 2017.

2.4.8 Management and organisation of exhibitions, compositions, drawings, design, hand-crafted items, prototypes, artwork and their projects, databases and software, thematic maps, for the Academic Fields ("Settori Concorsuali"), where this is appropriate.

- **Dataset** for benchmark SIFET

I organized this year (2016) to the definition of a dataset for a benchmark activities on photogrammetry drone also through action cam available for SIFET member. During the National Congress SIFET of this year these results were presented.

- **On the shoulders of giants** (historical database of scientific paper)

I am following the initiative "On the Shoulders of Giants" of SIFET devoted to the digitalization of the historical scientific paper related to all historical numbers (from 1951) of Bollettino della SIFET, available only on paper.

3 Teaching activity

3.1 Formal responsibility of Bachelor's (Laurea) and Master of Science's (Laurea Magistrale) degree courses in Italian and/or foreign universities.

In the most recent courses I put in bold the results of the questionnaires completed by the students for the Didactic Quality Board (CPD, Comitato Paritetico per la Didattica). I return an evaluation of the teaching expressed in the scale from 1 (minimum) to 4 (maximum). I excluded from the following the positions for exercise part of other courses. CFU is an acronym of the Italian version of European Credit Transfer and Accumulation System (ECTS). The first part of each course description define the course code of the Politecnico di Torino.

Academic year 2015/2016

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito) 8 CFU, CPD teacher quality index **3.76**

Academic year 2014/2015

03FMCMX Geomatics (Master of science-level of the Bologna process in Civil Engineering - Torino) 6 CFU, CPD teacher quality index **3.60**

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito) 8 CFU, CPD teacher quality index **3.82**

03QBOMI Disciplinary teaching (Active Internship Training In General Topography, Rural Construction And Representation - Torino), 2 CFU

Academic year 2013/2014

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito) 8 CFU, CPD teacher quality index **3.74**

Academic year 2012/2013

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito) 8 CFU

Academic year 2011/2012

02AHENB Digital mapping and GIS (Master of science-level of the Bologna process in Building Engineering, Polito) 8 CFU

Academic year 2010/2011

01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5

01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2009/2010

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
 04BALFY Photogrammetry (Master of science-level of the Bologna process in Engineering of Land Protection - Torino) CFU 6
 01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2008/2009

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
 04BALFY Photogrammetry (Master of science-level of the Bologna process in Engineering of Land Protection - Torino) CFU 6
 01CWYFB Surveying e cartography (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6
 01IMEFZ, 01IMEGD Digital mapping and GIS (Master of science-level of the Bologna process in Environmental Engineering; Master of science-level of the Bologna process in Building Engineering, - Torino) CFU 6

Academic year 2007/2008

- 02BAMFB, 02BALFU Applied Photogrammetry, Photogrammetry (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) 6 CFU
 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5

Academic year 2006/2007

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
 02BAMFB, 02BAMBX, 2BAMEO Applied Photogrammetry, Photogrammetry (1st degree and Bachelor-level of the Bologna process in Architectural Sciences - Torino; 1st degree and Bachelor-level of the Bologna process in Civil Engineering - Torino; 1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino), CFU 6

Academic year 2005/2006

- 01IKWEW Surveying I (1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 5
 01IKWEW Surveying I PRLP(1st degree and Bachelor-level of the Bologna process in Civil Engineering for water management - Mondovi') CFU 6.

Academic year 2004/2005

- 02FIJBX Surveying e cartography C (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2003/2004

- D2200, R2200 Applied Photogrammetry (Master of science-level of the Bologna process in Environmental and Land Engineering, Pre 2000 - Torino; Master of science-level of the Bologna process in Civil Engineering, Pre 2000 -- Torino) CFU 10
 03FBH Fundamental of GIS/LIS (Master of science-level of the Bologna process in Environmental and Land Engineering - Mondovi') CFU 10
 02FIH Surveying e cartography B (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2002/2003

- 01FCM Laboratory of geomatics (Master of science-level of the Bologna process in Civil Engineering - Torino) CFU 6
 01FIH Surveying e cartography B (1st degree and Bachelor-level of the Bologna process in Building Engineering - Torino) CFU 6

Academic year 2001/2002

- 9706S Digital mapping (1st degree and Bachelor-level of the Bologna process in GIS- Torino) CFU 6

3.2 Formal responsibility of PhD courses in Italian and/or foreign universities.

Academic year 2015-2016

01QTZRS Geomatics and gis for environmental application and regional planning (PhD course in Urban And Regional Development – Politecnico di Torino)

Academic year 2014-2015

01QTZRS Geomatics and gis for environmental application and regional planning (PhD course in Urban And Regional Development – Politecnico di Torino)

Academic year 2013-2014

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2012-2013

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2011-2012

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2010-2011

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2009/2010

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

Academic year 2008/2009

01MPZKL Geomatica e GIS (PhD course in Environment and Land – Politenico di Torino)

I want also indicate numerous tutoring activities for academic stages (on average 5-6 per year) and numerous supervisor activities of several bachelor level thesis/ master's degree level thesis, in total over 120 dissertations since 2000, an average of 8 per year.

3.3 Formal responsibility of Specializing Master's courses and Life Learning courses in Italian and/or foreign universities in PhD courses.

I organized and taught in the following continuing education courses formalized through appropriate educational agreement of the Politecnico di Torino:

- in 2015, “*Geomatics Technologies – 3D Laser Scanner 3D*” (30 hours) for the College of Surveyors of Torino;
- in 2014 *Geomatics Technologies – 3D Laser Scanner 3D*” (30 hours) for the College of Surveyors of Torino;
- in 2013 “*Photogrammetry from drone, the automation of surveying process*”, (20 hours) for the College of Surveyors of Cuneo;
- in 2012, “*Practical course of digital 3D stereo- plotting*” (16 hours) for the University of Torino and Superintendent of Archaeologic Heritage of Regione Valle d'Aosta

Ho tenuto i seguenti corsi per le associazioni SIFET e ASITA con crediti professionali riconosciuti:

- in 2012, “*Specializing course of LIDAR*” (12 hours) during the National Conference of SIFET;
- in 2011, “*3D elevation model*” (4 hours) during the National Conference of SIFET;
- in 2015 “*Photogrammetry and Drone*” (12 hours), during the National Conference of ASITA;

I should like to mention here the educational activities carried out, in view of the role of University for Public Engagement, related to student teams. It is now four years that, with some colleagues prof.ssa Nannina Spano, prof. Piero Boccardo, prof. Marco Piras, we manage 2 student teams:

- Disaster Recovery Team (DIRECT), for the creation of crisis mappers, specialists can produce the basic map information quickly and accurately to enable a correct setting of the procedures early impact;
- POLICYCLE for the promotion of cycling as a means of sustainable urban transport and a possible tool for the urban survey.

3.4 Institutional offices and roles in Italian and foreign Universities and/or public and private institutions with scientific and/or technology transfer aims

3.4.1 *Institutional offices in teaching and research structures of Italian and Foreign Universities.*

- from 2007 to 2015, I was the Secretary of the *Collegio* of Building Engineering, the teaching structure devoted to organize Bachelor and Master of Science courses in Building Engineering;
- From 2015 to now, I am the Vice Coordinator of *Collegio* of Building Engineering;
- From 2015 to now (the project is going to evolve), I have been directly nominated by the Rector as representative for the Politecnico di Torino to follow the X-team project ("International Centre for Cultural Heritage Security", ICCHS). As described in the paper included in the next issue of the journal *Universitas* (<http://www.rivistauniversitas.it/>) and on the project website (<http://www.ichsteam.eu/>), in 2016 Politecnico di Torino, Università Ca' Foscari, IUAV, CORILA and SiTI have formalized a framework agreement to develop X-Team through a multidisciplinary training course aims to enhance the complementarity between the knowledge of the universities and strengthen the synergies between the relational systems, allowing the formation of technical experts in the cultural heritage security. The students, mostly refugees or displaced persons, will be chosen from students and researchers of the countries in conflict, with particular attention to young people who have been forced to interrupt their training process, and among the officials of cultural systems (museums, archaeological parks , etc.).
- from 2006 to 2010, member of Departmental board ("giunta di dipartimento", elective position);
- in 2012, I was a reviewer for the National Agency for the Evaluation of University and Research (*Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca* , ANVUR) as part of the Quality Assessment Research (*Valutazione della Qualità della Ricerca*, VQR).

3.4.2 *Management roles in Universities, as part of Faculty duties:*

From 2000 to 2006, members of didactic board of *Collegio* of Building Engineering;

From 2006 to 2011, members of some boards of *Collegio* of Building Engineering;

- didactic board;
- Self Evaluation board;
- Stage board.

From 2011 to 2015,

- representative for ERASMUS incoming/outgoing programs for *Collegio* of Building Engineering,
- members of some boards of *Collegio* of Building Engineering:
 - o didactic board;
 - o quality board;
 - o stage board;

- internationalization board.

From 2015 to today:

- representative for *Collegio* of Building Engineering of:
 - ERASMUS incoming/outgoing programs;
 - evaluation foreign students careers;
 - International students apply.
- members of some boards of *Collegio* of Building Engineering:
 - didactic board;
 - quality board;
 - stage board;
 - Internazionalization board.

3.4.3 Offices in the Governing bodies, Board of Governors, Scientific Advisory Boards of public and private institutions, with scientific and technology transfer aims.

- From 2006 to 2010, I was the President of a spin-off of Politecnico di Torino, “*SIR, Innovative solution for surveying*” and then member of Board of Governors;
- From 2010 to 2014, I was Secretary of Scientific Advisory Board of Italian Society of Surveying and Photogrammetry (*Società Italiana di Topografia e Fotogrammetria, SIFET*);
- From 2014 to today, I am the President of Scientific Advisory Board of Italian Society of Surveying and Photogrammetry (*Società Italiana di Topografia e Fotogrammetria, SIFET*);
- From 2014 to today, I am Member of Governing Council of Italian Society of Surveying and Photogrammetry (*Società Italiana di Topografia e Fotogrammetria, SIFET*);
- From 2014 to today, I am member of Scientific Advisory Board of Scientific Associations for Land and Environment (*Associazioni Scientifiche Italiane per il Territorio e l'Ambiente, ASITA*).

Allow me to add in this part some details of the service activities related to the university's public role that can be connected to the Public Engagement activities.

In this context, I describe my activities the judicial organs of state:

- Consultancy activities for the TAR (*Tribunale Regionale Amministrativo*) of Regione Piemontet related to an illegal activities carried out in the Vallone quarry in Romentino (NO). In this seat it was made a historical reconstruction of the evolution of a part of the quarry, by means of aerial images and historical cartographic data, together with a series of high-precision topographic acquisitioni on the field in aid to the hydrogeological measurements;
- Directlt recerence by my Rector for a verification activities for the State Council to locate properly a land parcel element of contention of a number of competitors for the tender to build a road in Valdisotto (SO);
- Consulting for the GIP Roberto Furlan of court of Torino during the investigation and the process for the murder of Alberto MUSY in Turin. The activities include the task of making anthropometric measurements from video captured by surveillance cameras located along the path of the killer and the definition of the characteristics of the gait in comparison with the accused.

Also promoter of some free initiatives:

- The CYCLAir project, a project without funding that is part of the Living Lab project of the Municipality of Torino with the aim to propose a system for monitoring the air quality using sensors mounted on the bicycle;
- The organization in 2014 of the "Geomatics day" workshops for the dissemination of geomatics issues in the various areas of administration, politics, education and research.

Torino, 31/01/2018

4 List of publications

2018

- [1] Aicardi, I., Bolli, P., Lingua, A.M., Paonessa F., Piras, M., Virone G. (2018). Electromagnetic characterization of installed antennas through UAVs. In: **Mechanisms and Machine Science** vol. 49, pp. 471-482
- [2] Dabove, P., Di Pietra, V., Lingua, A.M (2018). Close range photogrammetry with tablet technology in post-earthquake scenario: Sant'Agostino church in Amatrice. In: **GeoInformatica**, pp. 1-15, DOI: 10.1007/s10707-018-0316-7

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- [3] Chiabrando, F.; Di Pietra, V.; Lingua, A.M.; Cho, Y; Jeon, J. (2017) An original application of image recognition based location in complex indoor environments. DOI:10.3390/ijgi6020056. In **ISPRS International Journal Of Geo-Information** - ISSN:2220-9964, 2017, vol. 6(2) (56)
- [4] Marinelli, G.; Bassani, M.; Piras, M.; Lingua, A.M. (2017) Mobile Mapping Systems and Spatial Data Collection Strategies Assessment in the Identification of Horizontal Alignment of Highways. DOI:10.1016/j.trc.2017.03.020. pp.257-273. In **Transportation Research. Part c, emerging technologies** - ISSN:0968-090X vol. 79
- [5] Chiabrando, F.; Lingua, A.M.; Maschio, P. F.; Teppati Lose', L. (2017) The influence of flight planning and camera orientation in UAVs photogrammetry. a test in the area of Rocca San Silvestro (LI), Tuscany. DOI:10.5194/isprs-archives-XLII-2-W3-163-2017. pp.163-170. In **International Archives Of The Photogrammetry, Remote Sensing And Spatial Information Sciences** - ISSN:2194-9034, 2017, vol. XLII-2/W3
- [6] Lingua, Andrea Maria; Noardo, Francesca; Spano', Antonia Teresa; Sanna, Simone; Matrone, Francesca (2017) 3D model generation using oblique images acquired by UAV. In: **International Archives Of The Photogrammetry, Remote Sensing And Spatial Information Sciences**, vol. 42 n. 4/W2, pp. 107-115. - ISSN 1682-1750
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- [8] Paonessa, F.; Virone, G.; Bolli, P.; Pupillo, G.; Wijnholds, S. J.; Matteoli, S.; Lingua, A.; Piras, M.; Aicardi, I.; Maschio, P.F. (2017) Recent results on the characterization of the LOFAR radio telescope by means of a micro UAV. DOI:10.1109/ICEAA.2017.8065634. pp.1752-1753. In **2017 International Conference on Electromagnetics in Advanced Applications (ICEAA)**, Verona (IT), 11-15 Sept. 2017- ISBN:978-1-5090-4451-1
- [9] Piras, Marco; Taddia, Glenda; Forno, M.G.; Gattiglio, M.; Aicardi, Irene; Dabove, Paolo; Lo Russo, Stefano; Lingua, Andrea Maria (2017) Detailed geological mapping in mountain areas using an unmanned aerial vehicle: application to the Rodoretto Valley, NW Italian Alps. In: **Geomatics, Natural Hazards & Risk**, vol. 8 n. 1, pp. 137-149. - ISSN 1947-5705
- [10] Aicardi, Irene; Bolli, Pietro; Lingua, Andrea Maria; Paonessa, Fabio; Piras, Marco; Virone, Giuseppe (2017) Electromagnetic characterization of installed antennas through UAVs. In: **26th International Conference on Robotics in Alpe-Adria-Danube Region, RAAD 2017**, Turin (IT), 2017. pp. 471-482
- [11] Grasso, Nives; Lingua, Andrea Maria; Musci, Maria Angela; Noardo, Francesca; Piras, Marco (2017) An INSPIRE-compliant open-source GIS for fire-fighting management. In: **Natural Hazards**. - ISSN 0921-030X
- [12] Bolli, P.; Wijnholds, S.J.; De Lera Acedo, E.; Lingua, Andrea Maria; Monari, J.; Paonessa, Fabio; Pupillo, G.; Virone, Giuseppe (2017) In-situ characterization of international low-frequency aperture arrays by means of an UAV-based system. In: **2017 XXXIInd General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS)**, Montreal (CA), 19-26 Aug. 2017. pp. 1-4
- [13] Aicardi, Irene; Dabove, Paolo; Lingua, Andrea Maria; Piras, Marco (2017) Integration between TLS and UAV photogrammetry techniques for forestry applications. In: **Iforest**, vol. 10, pp. 41-47. - ISSN 1971-7458
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- [15] Paonessa, Fabio; Virone, Giuseppe; Bolli, Pietro; Lingua, Andrea M. (2017) UAV-based antenna measurements: Scan strategies. In: **11th European Conference on Antennas and Propagation (EuCAP 2017)**, Paris (FR), 19-24 March 2017. pp. 1303-1305

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- [16] Noardo F.; Lingua A.; Aicardi I.; Vigna B. (2016). *Cartographic data harmonisation for a cross-border project development.* In **APPLIED GEOMATICS** - ISSN:1866-9298, DOI:10.1007/s12518-016-0172-9.
- [17] Bolli, P.; Pupillo, G.; Virone, G.; Farooqui, M. Z.; Lingua, A.; Mattana, A.; Monari, J.; Murgia, M.; Naldi, G.; Paonessa, F.; Perini, F.; Pluchino, S.; Rusticelli, S.; Schiaffino, M.; Schillirò, F.; Tartarini, G.; Tibaldi, A. *From MAD to SAD: The Italian experience for the Low Frequency Aperture Array of SKA1-LOW.* In: **RADIO SCIENCE**, ed. American Geophysical Union, ISSN:0048-6604, vol. 51 (3), pp. 160-175, doi: 10.1002/2015RS005922

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- [19] Noardo, F.; Lingua, A.; Aicardi, I.; Vigna, B. (2016) *Cartographic data harmonisation for a cross-border project development*, In: **APPLIED GEOMATICS**, ISSN:1866-9298, doi: 10.1007/s12518-016-0172-9
- [20] Virone, G.; Paonessa, F.; Peverini, O.A.; Addamo, G.; Orta, R.; Tascone, R.; Lingua, A.; Piras, M.; Bolli, P.; Pupillo, G.; Monari, J., (2016) *Antenna Pattern Measurement with UAVs: Modeling of the Test Source*. In: **proceedings of 2016 10th European Conference on Antennas and Propagation (EuCAP)**, Invited presentation, ed. IEEE, Davos (CH), doi: 10.1109/EuCAP.2016.7481744

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- [21] Bolli P., Farooqui M.Z., Lingua A.M., Mattana A., Monari J., Murgia M., Naldi G., Paonessa F., Perini F., Pupillo G., Rusticelli S., Schiaffino M., Schillirò F., Tartarini G., Tibaldi A., Virone G. (2015) *From MAD to SAD: the Italian experience for SKA-LFAA*. In: **URSI Atlantic Radio Science Conference (AT-RASC)**, Gran Canaria, Canary Islands, May 18-22 2015, ISBN:978-1-4799-6871-8, doi: 10.1109/URSI-AT-RASC.2015.7303176
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