

European Regional Symposium



Second Edition of the European Regional
Symposium, on space data for tourism &
agriculture, by NEREUS Regions




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Picture	Name	Bio
NEREUS Secretariat		
	<p>Roya Ayazi</p>	<p>Roya Ayazi heads the Brussels/Belgium-based secretariat and is the main interface for the association at the European level. Backed up by her training as a lawyer in Germany and over 20 years of work in European affairs, her core responsibilities are advocacy at the European, regional and local level as well as positioning and coordinating the Network with respect to space policy developments. As a member of different advisory councils of EU-funded projects, she supports NEREUS members' activities by representing the regional dimension in EU space developments. NEREUS made Roya a space enthusiast and she joined Women in Aerospace (WIA) to share the fascination with other women and win newcomers for the sector.</p>



Margarita Chryski

Margarita Chryski collaborates with the Secretary General in the overall management and promotion of the Network's activities, including being tasked with the communication of pan-European/European Space Agency (ESA)-funded initiatives and managing the website and other communication tools. Her work experience and in-depth knowledge of politics, communication and space studies, which are underpinned by her Masters' degrees, clearly emerged in her publication entitled 'The Sustainable Commercialisation of Space: The Case for a Voluntary Code of Conduct for the Space Industry' in the world's leading academic journal, Space Policy. In 2023, she has been appointed as mentor of Space4Women, an initiative of UNOOSA.



Damati Goedemond

Damati Goedemond is a law student at Free University Brussels (Vrije Universiteit Brussel). She is passionate about space, its technologies and the seemingly endless possibilities it entails. At NEREUS, she is a trainee.

In her spare time, she is also involved in the Space Law and Policy Project Group at the Space Generation Advisory Council as Events Coordinator and Researcher for the Earth Observation and Human Rights team. Some of her previous experiences include various traineeships in a Big Four consulting firm, a multinational and a law firm. She previously was president at a chapter of United Nations Youth Association, a student representative and voluntarily researched for UNDP and UN Women.




Lucio Bernardini Papalia

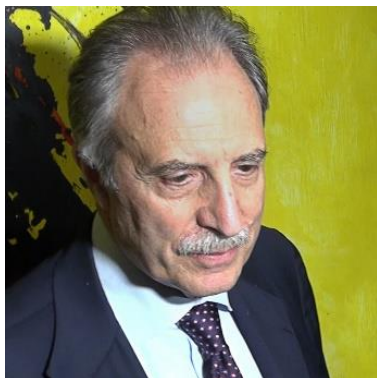
Lucio Bernardini Papalia is currently Head of Basilicata Region Brussels Antenna managed by Sviluppo Basilicata SpA. He graduated in law from the University of Perugia, specializes in European policies, programs and funding and obtains the diploma of "Community Operator" at SIOI (Italian Society for International Organization- Italian Association for UN). He attended advanced training courses at European College of Parma and he made an internship in Brussels at the EC, DG XXIII Business, trade and tourism policy. He has been working for more than 30 years, mainly in Brussels or in an international context, as senior consultant and project manager in the field of institutional relations with the EU, of European projects, policies and funding and technical assistance to Italian regions and third countries. He was director of consulting firms and member of the management board of Italian companies and international associations such as NEREUS, the European Network of regions using space technologies, which he helped to found and develop.



Chiara Fanelli

Chiara Fanelli is currently personal assistant of the Basilicata Region President and in charge of institutional relations. She is a member of his political secretariat and graduated in economics and management of the business crisis at LUMSA University of Rome.

Picture	Name	Bio
	<p>Adolfo Urso</p>	<p>Adolfo Urso has been the Minister of Business and Made in Italy since 22 October 2022. Born in Padua, he graduated in Sociology from the “La Sapienza” University of Rome. A professional journalist since 1983, he has worked in Rome and Naples. Among the founders of the National Alliance, he was the national coordinator of the promoting Committee from 1993 to 1995 and organizer of the Fiuggi congress in 1995. In 2008 he was among the founders of the People of Freedom, before joining Fratelli d'Italia in 2013. Member of the Chamber from 1994 to 2013, for a total of 5 legislatures, in this period he was appointed Deputy Minister of Economic Development with responsibility for Foreign Trade in the Berlusconi II Government (2001-2006) and in the Berlusconi IV Government (2009-2010). In 2018 he was elected to the Senate in Veneto on the lists of the Brothers of Italy. Head of the Party's Enterprise and Productive Activities Department until June 2021 when he was elected President of the Parliamentary Committee for the Security of the Republic (Copasir). In the elections of 25 September 2022, he was elected senator in the Veneto constituency.</p>



Vito Bardi




Vito Bardi, former Deputy Commander General at Guardia di Finanza (Army Corps). He is the President of the Basilicata Region starting from 16 April 2019. He started his long military career joining Guardia di Finanza (Army Corps). He was promoted Colonel in December 1995 with the Command of Florence Legion (Tuscany Region). He was appointed Brigadier General in January 2001 and Head of the 1st Department of the General Command. He was promoted to Major General in January 2005, and Regional Commander of Campania Region. As General in the Army Corps, promoted in February 2009, he held the posts of Interregional Commander of Southern Italy and then Inspector for Educational Institutes. He was then appointed Deputy Commander General at Guardia di Finanza from 5/09/2013, until 4/09/2014. He is alternate member of the European Committee of the Regions, Vice President of Nereus network (European Space Regions) and member of ARA and ASA (European Automotive Regions). President Bardi holds a degree in economics, law, international and diplomatic sciences, financial economic security sciences.







Thierry Cotelle


Graduated as Engineer in Industrial Chemistry (Conservatoire National des Arts et Métiers), Thierry Cotelle has managed several SMIs (Small and Medium Industries) in the aeronautics sector for 25 years and is currently General Director of a Business Unit at Satys Aerospace.

In terms of political commitments, Thierry Cotelle has been Deputy Mayor of Toulouse in charge of employment, economic development, space and aeronautics between 2008 and 2014. Thierry Cotelle is Regional Councilor since 2016 and was previously President of the regional agency for renewable energies (AREC). Since 2021, he is First Vice President for the Commission “Economy, Employment, Re-industrialisation” and belongs to the following thematic commissions “Climate Emergency” and “Water and Risk Prevention”. Thierry Cotelle has been elected NEREUS President in December 2021. He is also a member of the Board of NEREUS-associate member Cité de l’Espace for 20 years.

Description & organization	Name E-mail	Website	Title of presentation
<i>Introduction to policies, programs and strategy on the use of space data</i>			
<p>Seconded National Expert at Unit for Earth Observation in the European Commission - Directorate-General for Defence Industry and Space (DEFIS)</p>	<p>Luca Fasano</p>	<p>https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/defence-industry-and-space_en</p> 	<p>“Copernicus User-Uptake and use of space data strategies”</p>
<p>Copernicus Italian National User Forum Coordinator</p>	<p>Andrea Taramelli Nico Bonora</p>	<p>https://www.copernicus.eu/en</p> 	<p>“The national Copernicus User-Forum”</p>
<p>Copernicus User Expert in ESA’s Directorate of Earth Observation Programmes</p>	<p>Alessandra Tassa</p>	<p>https://www.esa.int/About_Us/Business_with_ESA/Business_Opportunities/Earth_Observation_Programmes</p> 	<p>“The Copernicus Space Component: current status and perspectives”</p>

Officer at EUMETSAT & Senior Scientist at Consiglio Nazionale delle Ricerche	Federico Fierli	https://www.eumetsat.int/ 	“Present and future Copernicus and Operational satellites for environmental monitoring”
<i>Introduction into the market of space data and to the space economy</i>			
Head of Pilot Projects Office, Downstream and Application Services at Italian Space Agency	Maria Libera Battagliere	https://www.asi.it/en/ 	“Space technology for agriculture and tourism: practices, challenges and opportunities in the Italian ecosystem”
Onsite consultant for Market Development Department, EUSPA	Jacopo Ovarelli	https://www.euspa.europa.eu/ 	“Copernicus User Uptake Strategy & market development”
Chair of the Transition Committee of ECSECO - European Centre for Space Economy and Commerce	Prof. Vito Albino	https://ecseco.org/ 	“Space and non-space business in a joint transition”



Skills for space sector: from schools to universities



Professor Astrophysics at University of Basilicata	Prof. Valerio Tramutoli	https://ingegneria.unibas.it/site/home.html 	“How to prepare workforce and talents to address space skills in business, research and public administration” – Annex I
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Description & organization	Name Function	Website	Abstract
<p>Basilicata Aerospace Cluster represents the Italian region Basilicata in aerospace. Strong focus on development of earth observation and technologies.</p>	<p>Antonio Colangelo, President Basilicata Aerospace Cluster</p>	<p>https://www.clusterlucanoaeroporto.it/en/</p> 	<p>-</p>
<p><i>Space data for tourism: linking space to user needs</i></p> <p>Round Table: Representatives of European Regions and of the EC present tourism promotion strategies, offers and needs as well as the EU transition pathway for tourism and data space for tourism.</p>			
<p>Economic Development and Employment is a policy area of the Basilicata Region. It aims to foster the growth and diversification of the regional economy.</p>	<p>Michele Casino, Minister for Economic Development and Employment Basilicata Region</p>	<p>https://www.regione.basilicata.it/giunta/site/giunta/department.jsp?dep=100055</p> 	<p>-</p>
<p>The Directorate for Economic Development and Employment is a department of the regional government of Basilicata. This department is responsible for</p>	<p>Canio Sabia, Director General Directorate for Economic Development and Employment Basilicata Region</p>	<p>https://www.regione.basilicata.it/giunta/site/giunta/department.jsp?dep=100055</p>	<p>-</p>



<p>promoting economic growth and employment opportunities within the region. The Directorate for Economic Development and Employment plays a key role in implementing this strategy and achieving the region's economic goals.</p>			
<p>The mission of Directorate G in DG GROW (Internal Market, Industry, Entrepreneurship and SMEs) is to contribute to the responsible, digital, resilient and inclusive recovery and growth of industrial ecosystems and SMEs, with a particular focus on: Tourism; Textiles; Proximity and Social economy; Cultural and creative industries.</p>	<p>Valentina Superti, Director, European Commission, DG GROW, Directorate G. Ecosystems II: Tourism and Proximity</p>	<p>https://op.europa.eu/en/web/who-is-who/organization/-/organization/GROW/COM_CRF_212283</p> 	<p>“European Commission: The transition pathway for the tourism ecosystem and the tourism data space”</p>
<p>Tourism promotion strategies, offers and needs</p>			
<p>The Regional Promotion Agency of Basilicata is an organization that promotes the region of Basilicata. The agency is responsible for promoting tourism, culture, and economic development within the region. It provides information and resources to visitors and businesses and works to showcase the unique attractions and opportunities that Basilicata has to offer.</p>	<p>Antonio Nicoletti, General Director of the Regional Promotion Agency of Basilicata</p>	<p>www.basilicataturistica.it/en</p> 	
<p>The Regional Council of Occitanie is the deliberative assembly of the region of Occitanie, the southernmost administrative region of</p>	<p>Vincent Garel, Member of the Regional Council Occitanie and President of Comité Régional du Tourisme</p>	<p>https://www.laregion.fr/GAREL-Vincent</p>	<p>“Use of Murmuration solutions as part of an Atout France experiment” – Annex II</p>




<p>metropolitan France excluding Corsica. The Comité Régional du Tourisme Occitanie (CRTL Occitanie) is a regional tourism committee in the Occitanie region of France. Its mission is to support the development of the region's tourism economy.</p>			
<p>The Austrian National Tourist Office (ANTO) is Austria's national tourism marketing organization. ANTO cooperates closely with the Austrian tourism industry, including the tourist boards of the Federal Provinces and tourism businesses. Its responsibilities include market research, brand management, marketing, networking, and information provision. ANTO serves as a knowledge hub for the Austrian tourism ecosystem.</p>	<p>Austrian National Tourist Office</p>	<p>https://www.bmaw.gv.at/en/Tourism/tourism-governance/Austrian-National-Tourist-Office.html</p> 	<p>“Digital transition: towards the data space for EU tourism”</p>
<p>The Director-General for Knowledge, Research, Labour and Enterprises of the Emilia-Romagna Region is responsible for planning and management of the main policies of the Directorate such as the Triennial Programme on Productive Activities, the Triennial Programme for Research, the Regional Energy Programme and the activities of the Regional Desk for the Internationalization of SMEs. She is also the managing authority for the ROP ERDF and ESF 2014-2020 and</p>	<p>Morena Diazi, Director-General for Knowledge, Research, Labour and Enterprises of the Emilia-Romagna Region</p>	<p>https://www.regione.emilia-romagna.it/en/research-and-innovation</p> 	<p>“The possible role of satellite data for the development of a digital twin for slow tourism in the Emilia Romagna Region”</p>


<p>RP ERDF and ESF+ 2021-2027 for the Emilia-Romagna region. Morena Diazzi has contributed to the development of European networks for the promotion of projects in the field of SMEs support, local development, and research.</p>			
<p>The Apulia Region has implemented sustainable tourism development strategies aimed at increasing the region's competitiveness and the "seasonal adjustment" of the local tourism industry, based on the valorization of cultural, historical, and natural regional assets. The region's goal is to strengthen the value of its destination sites through the quality and variety of tourism facilities, as well as to foster skills and capacities at the local level to develop sustainable tourism and local development in an integrated way.</p>	<p>Angelo Fabio Attolico, Head of Tourism and Internalisation Section – Apulia Region</p>	<p>https://www.regione.puglia.it/web/turismo-e-cultura</p> 	<p>"Future trends of tourism sectors"</p>
<p>ESA and regional Cluster representatives (SMEs, Research players, academia,) present space solutions, services and experiences to be discussed with stakeholders of the tourism sector</p>			
<p>The European Space Agency (ESA) is an intergovernmental organization that is dedicated to exploring space and advancing scientific knowledge. The ESA Business Applications Space Solutions (BASS) program aim to help diverse industries develop everyday applications, creating and supporting sustainable</p>	<p>Borja Pickering, Downstream application engineer ESA and GIS consultant with more than six years of experience with familiarity with customer engagement and start-ups.</p>	<p>https://business.esa.int/funding/space-for-tourism</p> 	<p>"Space for tourism"</p>



<p>businesses using satellite data and technology. ESA believe that Tourism sector vertical has great potential to expand its business limits, and ESA is ready to bring their support thanks to our funding schemes.</p>			
<p>Round table representatives of regional space clusters and organizations: Space applications and services for tourism</p>			
<p>Murmuration SAS is a green-tech company based in Toulouse, France, that provides solutions for sustainable tourism, environmental monitoring and social impact using satellite images, artificial intelligence and big data. It offers services such as air quality certificates, carbon footprint assessments, destination management tools and impact measurement reports.</p>	<p>Tarek Habib, Chief Executive Officer MURMURATION</p>	<p>https://murmuration-sas.com/en/homepage</p> 	<p>"Putting numbers on sustainable tourism" – Annex III</p>
<p>GEOCART S.p.A/DIGITAL LIGHTHOUSE is an Italian engineering company that specializes in 3D computer graphics, remote sensing, aerospace technologies, ICT and multidisciplinary design. It was founded in 2013 as a research and development project by Geocart S.p.A., an Italian company in the same industry.</p>	<p>Raffaele Santangelo, Chairman of Board, GEOCART S.p.A/ DIGITAL LIGHTHOUSE</p>	<p>https://digitallighthouse.it/</p> 	<p>"The integration of digital solutions for the immersive enjoyment of cultural heritage: application for sustainable tourism"</p>


<p>Digmat S.p.A. is an Italian company that provides and integrates systems and solutions for aerospace, defense, security, telecommunications, energy and smart cities. It has its headquarters in Matera. It is part of the Digmat Group, a network of companies that focus on technology and innovation.</p>	<p>Angelo Donvito, CEO DIGIMAT SPA</p>	<p>https://en.digmat.it/</p> 	<p>“Joint use of EO, IoT, AI, IoT and Digital Twin technologies for the management of tourist flows and the safeguarding of fragile tourist sites”</p>
<p>OPENET TECHNOLOGIES S.p.A. is an SME that designs, builds and manages services and infrastructures for satellite telecommunications in Europe and Africa. It was founded in 2000 in Matera, Italy, as a spin-off of a group of researchers. It also operates in the fields of ICT, e-Gov, education and communication. It is the founder of SPARKme, a technological accelerator dedicated to space business.</p>	<p>Filomena Cuccarese, Managing Director OPENET TECHNOLOGIES SPA</p>	<p>https://openet.it/?lang=en</p> 	<p>“From rural to global: space technologies to innovate tourism” – Annex IV</p>
<p>The Cartographic and Geological Institute of Catalonia (ICGC) is a public body in Catalonia that is responsible for geodesy, cartography, spatial data infrastructure, and geological knowledge and information. It provides various services and products related to geographic information and geology.</p>	<p>Jordi Corbera, Cartographic and Geological Institute of Catalonia</p>	<p>https://www.icgc.cat/en/</p> 	<p>“Earth Observation and climate impacts over economic activities as tourism: a Catalan perspective”</p>

<p>AstroTectonic is a start-up company based in Poland that offers innovative methods and technologies for earthquake analysis and monitoring using multi-channel measurements, including cosmic rays.</p>	<p>Noemi Zabari, CEO & Co-founder Astrotectonic</p>	<p>https://astroteq.ai/</p> 	<p>"From Above and Below: Seismic Activity Management System optimizing tourism and agriculture" - Annex number V</p>
<p>September, 29th (second day) Space data for Agriculture: linking space to user needs Round Table: Representatives of regional agriculture departments and agencies present Agriculture strategies, Offer, and Needs</p>			
<p>The European Space Agency (ESA) is an intergovernmental organization that is dedicated to exploring space and advancing scientific knowledge. The ESA Business Applications Space Solutions (BASS) program aim to help diverse industries develop everyday applications, creating and supporting sustainable businesses using satellite data and technology. ESA believes that Agriculture sector vertical has great potential to expand its business limits, and ESA is ready to bring their support thanks to our funding schemes.</p>	<p>Borja Pickering, Downstream application engineer ESA and GIS consultant with more than six years of experience with familiarity with customer engagement and start-ups.</p>	<p>https://business.esa.int/</p> 	<p>"Space for agriculture"</p>
<p>How to improve the use of space data in agriculture policy?</p>			
<p>The Integrated Control and Payments Service of the Department of Climate Action, Food and Rural Agenda, Paying Agency of Catalonia is a public</p>	<p>Laura Ruana Pavon, Head of the Integrated Control and Payments Service of the Department of Climate Action,</p>	<p>https://agricultura.gencat.cat/ca/inici/index.html#googtrans(ca en)</p>	<p>"Experience with the monitoring of CAP aids in Catalonia. 2019- 2023"</p>





<p>entity that manages the payments of the common agricultural policy (CAP). The CAP funds are allocated by the EU to support farmers, rural development and environmental protection in the agricultural sector. The Integrated Control and Payments Service ensures that the payments are carried out correctly, prevents and recovers irregularities, and monitors the compliance with the CAP rules.</p>	<p>Food and Rural Agenda, Paying Agency of Catalonia</p>		
<p>The Basilicata Region Agriculture Department is a regional institution that oversees the policies and activities related to the agricultural, food and forestry sectors in Basilicata. The department also promotes innovation and digital transformation in the agro-food supply chains.</p>	<p>Emilia Piemontese, General Director of Basilicata Region Agriculture Department</p>	<p>https://www.regione.basilicata.it/giunta/site/giunta/departement.jsp?dep=100049&area=242342&level=0</p> 	<p>“The needs of digital and space solutions for agriculture, forestry and rural development”</p>
<p>Agriculture and Rural Development is a division of the Tuscany Region. It is responsible for implementing the Rural Development Programme (RDP) for Tuscany, which outlines the priorities and measures for using the public funds available to support the rural areas of Tuscany. This division also promotes rural tourism, a driving</p>	<p>Roberto Scalacci, Director for Agriculture and Rural Development, Tuscany Region</p>	<p>https://www.regione.toscana.it/agricoltura-e-alimentazione</p> 	<p>“Generate more benefits from new high tech-based solutions for agriculture, forestry and rural development: the experience of Tuscany Region with Precision Farming and its regional Community of Practice”</p>




force for regional development and diversification of the rural economy in Tuscany.			
The regional observatory for organic agriculture is an initiative of the Agriculture Department of the Puglia Region. The observatory collects and analyses data on the organic production, consumption and market in Puglia, and provides information and guidance to the stakeholders involved in the organic sector. The observatory is also part of the Rural Development Program (RDP) for Puglia, which allocates public funds to improve the competitiveness and sustainability of agriculture and forestry in Puglia.	Salvatore Infantino, Head of the regional observatory, Agriculture Department, Puglia Region	https://www.regione.puglia.it/web/agricoltura 	“Remote Sensing for emergency management Xylella fastidiosa”
<p>Round table representatives of regional space clusters/organisations: <i>Space applications and services for agriculture</i></p> <p>Regional Cluster representatives (SMEs, Research players, academia,) present space solutions, services and experiences to be discussed with Agriculture sector stakeholders: Different representatives of regional clusters/aerospace districts take the floor</p>			
E-GEOS was formed in by the Italian Space Agency (ASI) and Telespazio S.p.A., to develop and commercialize services, products and applications in the Earth Observation sector. E-	Fabio Volpe, E-GEOS SPA Matera	https://www.e-geos.it/en/	“EO4AGRI project: How to improve operational monitoring of agriculture and implementation of EU Common




<p>GEOS is one of the main industrial players in the Copernicus Program, a European initiative for monitoring the Earth's environment and security. E-GEOS also runs a multi-purpose 24h Emergency Crisis Room and Mapping Centre for emergency analysis products that can provide near real time geo-information for natural disasters, humanitarian crises and maritime safety.</p>			<p>Agricultural Policy with a focus on Paying Agency requirements and Integrated Administration and Control System (IACS) processes”</p>
<p>Agri Sud-Ouest Innovation is an innovation cluster for ecology smart agrifood chains in France. It brings together more than 400 organizations and 5000 people from the economic, political, research and training sectors. Agri Sud-Ouest Innovation aims to foster, promote and support real world innovations that address the challenges of sustainable and resilient food systems.</p>	<p>Laurent Augier, Director of Agri Sud-Ouest Innovation cluster, Nouvelle Aquitaine and Occitanie Regions</p>	<p>https://en.agrisudouest.com/</p> 	<p>“Illustrations of advances and innovations in the use of space data and technologies to meet the challenges of agriculture in South-West of Europe” - Annex VI</p>
<p>Constellr is a space tech company that develops thermal infrared microsattellites for global land surface temperature monitoring. It is a spin-off of the Fraunhofer Institute and operates in Germany and Belgium. Constellr aims to provide high-precision smart</p>	<p>Dr. Tobias Leismann, Innovation Lead constellr</p>	<p>https://constellr.com/</p>	<p>“constellr – a satellite mission for agriculture in a time of climate change” – Annex VII</p>

<p>farming services for the agricultural sector, such as water management, crop health, yield forecasting, and disaster monitoring. Constellr also supports global food security in a time of climate change.</p>			
<p>Intecs Solutions SpA is a private Italian company that specializes in the design and development of high-tech electronic systems. It operates in the markets of aerospace, transportation, defense, and telecommunications, providing engineering and software solutions for mission-critical and safety-critical applications.</p>	<p>Alessandro Gentile, Remote Sensing Expert at Intecs Solutions SpA</p>	<p>https://www.intecs.it/</p> 	<p>“Continuous Monitoring of Agricultural Crops - Use case application on vineyards” – Annex VIII</p>
<p>Agricolus is an innovative company that develops solutions for precision agriculture and smart farming. It was founded in 2017 in Perugia, Umbria, the “green heart” of Italy. It offers a platform that uses digital tools such as satellite imagery, weather data, crop models, pest and disease alerts, and traceability systems to help farmers and agronomists optimize their work in the field and achieve environmental and economic sustainability goals.</p>	<p>Andrea Cruciani, CEO of Agricolus</p>	<p>https://www.agricolus.com/en/</p> 	<p>“Digital and space solutions for agriculture: case of AgriTrack Full DSS Stack” – Annex IX</p>

<p>Latitudo40 is a technology company that focuses on environmental sustainability and ESG policies.</p> <p>Their data analytics platform is based on satellite images and artificial intelligence, providing data that lead to decisions that are economically sound and sustainable.</p> <p>Latitudo40 has developed specific algorithms to analyze the evolution of urban areas over time, creating thematic maps highlighting the consumption of land or green.</p>	<p>Mauro Manente, COO LATITUDO40, a Techstars_ Portfolio Company</p>	<p>https://www.latitudo40.com/</p> 	<p>“LA.U.R.A. Latitudo Unmanned Rover for Agriculture solution” - Annex X</p>
<p>The University of Agriculture in Krakow is one of the leading universities in the area of life sciences in Poland.</p> <p>The university offers a variety of faculties including Agriculture and Economics, Forestry, Animal Science, Environmental Engineering and Surveying, Biotechnology and Horticulture, Production and Power Engineering, Food Technology, and a University Centre of Veterinary Medicine.</p>	<p>Krystyna Michałowska, PhD, The University of Agriculture</p>	<p>https://study.gov.pl/university/university-agriculture-krakow</p> 	<p>"Fusion of Remote Sensing and Geospatial Data: Enhancing Information Capacity for Agricultural Crop Monitoring" - Annex XI</p>
<p>The Center for Satellite Navigation Hessen (cesah) is a company that supports start-ups, entrepreneurs, and innovators in the field of satellite navigation</p>	<p>Andreas Kanstein, Managing Director cesah (Hesse)</p>	<p>https://cesah.com/</p>	<p>-</p>

<p>and related applications. It is part of the European Space Agency (ESA) Business Incubation Centre (BIC) network. Cesah offers various services, such as funding, coaching, networking, technology transfer and events to help its clients develop their business ideas and products.</p>			
<p>Telespazio is one of the main operators in the field of satellite services, geoinformation, and network navigation systems. Telespazio operates in various markets, such as defense, aeronautics, space, meteorology, and telecommunications. Club Galaxie is a network that brings together and welcomes a hundred entrepreneurs, managers from all sectors and institutions that represent more than 18,000 industrial and service jobs in the Toulouse region.</p>	<p>Jean-Marc Gardin, CEO Telespazio France & President Club Galaxie</p>	<p>https://www.telespazio.com/en/home</p>  <p>https://www.club-galaxie.com/</p> 	<p>“Club Galaxie presentation and GeoAdventice presentation (EO services to optimize Agriculture)”</p>
<p>DTA Aerospace Technology District scarl is a nonprofit consortium society that promotes the development of the aerospace sector in Apulia region. DTA is part of the National Aerospace Technology Cluster (CTNA) and it is involved in various projects and initiatives</p>	<p>Vincenzo D'Avino, DTA Aerospace Technology District scarl</p>	<p>https://www.dtascarl.org/en/homepage/</p> 	<p>“Territorial Basic Knowledge Acquisition: TEBAKA” – Annex XII</p>

related to aerospace, such as SKEYE.			
<p>ENEA is the Italian National Agency for New Technologies, Energy and Sustainable Economic Development. It is a public body that conducts research and innovation activities in the fields of energy, environment, and sustainable economic development. It also provides advanced services to enterprises, public administrations, and citizens.</p>	<p>Francesco Immordino - Elena Candigliota,</p> <p>ENEA, Italian National Agency for New Technologies, Energy and Sustainable Economic Development</p>	<p>https://www.enea.it/en</p> 	<p>“Copernicus services and products for land management for applications in Agriculture: Emergencies, Monitoring, Mapping”</p>
<p>SAFE - School of Agricultural, Forest, Food and Environmental Sciences is a school of the University of Basilicata. It offers undergraduate, graduate and postgraduate programs in various fields related to agriculture, forestry, food and environment. It also conducts research and innovation activities in collaboration with public and private institutions.</p>	<p>Prof. Angelo Nolè, University of Basilicata, SAFE - School of Agricultural, Forest, Food and Environmental Sciences</p>	<p>https://portale.unibas.it/site/en/home/about-us/departments-and-schools/articolo6708.html</p> 	<p>"Temporal and spatial patterns assessment of riparian vegetation cover in the Mediterranean region using Landsat spectral metrics"</p>
	<p>Maria Castellaneta, University of Basilicata, SAFE - School of Agricultural, Forest, Food and Environmental Sciences</p>		<p>"Canopy cover dynamics in dieback affected oak forests captured by phenological behaviour" – Annex XIII</p>

	Costanza Fiorentino - Paola D'Antonio, University of Basilicata, SAFE - School of Agricultural, Forest, Food and Environmental Sciences		“The role of automatic guide in precision agriculture: form remote sensing to prescription maps in the Bari -Matera 5G Project”
Meteorological Environmental Earth Observation (MEEO) S.r.l. is a company that specializes in the use of Climate and Earth Observation data and tools. The team at MEEO has a decade- long experience and passion for innovative solutions in the field of space data management and processing. The company is headquartered in Ferrara, Italy.	Marco Folegani, Meeo s.r.l.	https://www.meeo.it/ 	“Agrifood systems in the new climate trend” – Annex XIV
Aerospace Valley is an aerospace cluster located in France. It serves as a collaborative network that brings together various stakeholders in the aerospace industry, including companies, research institutions, and universities. This cluster fosters innovation, research, and development in the field of aerospace, contributing to advancements in technology and the growth of the industry.	Ioana-Simona Rosca, European Space and Climate Project Manager, Aerospace Valley	https://www.aerospace- valley.com/ 	“PROTECT - Preparing a Pre-Commercial PROcurement for end- user services based on environmenTal obsERvation in the area of Climate change adapTation and mitigation” – Annex XV

I. How to prepare workforce and talents to address space skills in business, research and public administration

Valerio Tramutoli



Valerio Tramutoli was born on 12/28/1957. Graduated in Physics at the University of Rome La Sapienza, he is Full Professor of Astronomy, Astrophysics, Physics of the Earth and Planets at the School of Engineering of the University of Basilicata where he is holding courses in Environmental Remote Sensing and General Physics since 1997. Since 1991 he has been visiting scientist in the main international centers involved in the Earth's observation by satellite taking part in several international projects and initiatives of the main space agencies like ESA, NASA, NASDA and ASI. He has been the national coordinator of the SEISMASS Project (funded by ASI) PI, or responsible of DIFA participation, to several international projects funded by NATO and by EC in the framework of the Science for Peace, FP6-IST, FP6-INTAS, FP6+FP7 GMES initiatives. In 2010 he is the coordinator of the European project PRE-EARTHQUAKES funded by EC in the framework of the FP7-GMES-Space. From

2013 up to 2020 he has been chairing the NEREUS Copernicus/EO WG. Since 2014 he was member of the International Scientific Commission for the launch of CSES, the first Chinese satellite (in collaboration with ASI) for the study of ionospheric precursors of earthquakes. In 2013, together with Prof. Peter Zeil of the University of Salzburg, he was the promoter of the European Copernicus Academies Network. Since 2019 he is the vice-chair of the IUGG-WG EMSEV. He is the author of more than 200 scientific works published in journals, books and international conference proceedings. He has been chair, co-chair, session organizer and invited speaker in the most important international geophysics conferences (EGU, AGU, IUGG, AOGS, IGARSS). Since 2021 is the President of the Technical Scientific Committee of the TeRN Consortium and from 2022 of that of the Lucanian Aerospace Cluster.

In the catalog of the almost 3000 professions recognized at European level by ESCO (European Skills/Competences and Occupations) the reference to EO technologies experts is completely absent.

The lack (at European level) of a unique academic curriculum, offering the opportunity to researchers and professionals to acquire the full chain of knowledge required to move from the design of advanced EO systems and sensors up to the development of applications and services based on EO data, has been, since last decade, recognized by the Commission as an important gap in the Copernicus User Uptake Strategy.

The joint efforts, preliminary results and future perspectives in this direction will be shortly resumed in the talk.

II. Utilisation des solutions Murmuration dans le cadre d'une expérimentation Atout France

Vincent Garel

Comme toute activité économique et sociale, le tourisme a besoin de données et de recherches pour permettre et soutenir son développement réussi et durable.

Pour contrôler la durabilité, il est nécessaire de disposer de données sur l'utilisation des ressources, telles que la terre, l'énergie et l'eau, les émissions et le traitement des déchets, la dégradation, la (sur)fréquentation, la congestion et les nuisances. L'évaluation des impacts sociaux, économiques et environnementaux permet de concevoir et de mettre en œuvre des politiques et des stratégies visant à maximiser la contribution positive du tourisme et à minimiser ses effets négatifs.

C'est dans ce contexte que Murmuration a proposé ses services à Atout France.

Après une présentation des différentes possibilités en matière de suivi environnemental et comportement humain, les thématiques suivantes semblent d'intérêt pour la réalisation d'un POC (Proof Of Concept) :

- Une étude comparative de la qualité de l'air et de la fréquentation touristique.
- Le suivi de l'artificialisation et de la végétalisation sur le territoire
- L'identification des zones sujettes à une dégradation de l'environnement combiné à des données sur la fréquentation des sites.

Objectif du projet

L'objectif du projet est pluriel, il permet :

- D'explorer l'introduction de la dimension environnementale, quantitativement, dans les outils de pilotage de l'activité touristique
- Comprendre la dynamique régionale, les sites d'intérêts et leur relation avec l'environnement
- Étudier l'impact des décisions politiques sur l'état environnemental des zones touristiques.

Murmuration propose de réaliser un premier tableau de bord permettant d'explorer ces thématiques sur la région Occitanie, avec pour objectif d'accompagner l'ensemble des territoires au niveau national en collaboration avec Atout France.

En complément et pour info, nous répondons conjointement avec Atout France et le CRT AuRA à un AMI du CNES qui pourrait nous permettre de financer des développements spécifiques à partir des données satellitaires, avec Murmuration éventuellement.

III. Putting numbers on sustainable tourism

Tarek Habib

Tourism is probably the largest, most global supply chain that ever existed where we, as individuals, happily choose to be the goods. Despite the major importance of this industry, from a social and economic perspective, we lack clear quantitative information and data regarding its environmental sustainability.

Tourism crystalizes one of the most complex challenges in this era of climate change as to how to find the right compromise between the three pillars of sustainability. The starting point is certainly to quantify the equation, a first step toward its optimization.

For this effort to be impactful it needs to be applicable on a global scale and based on a methodology that is independent from local capabilities. This is where satellite assets and technologies come into play. First, the existing archives are a fantastic time machine, and second, they provide the required global coverage enabling efficient benchmarking and return on experience.

In this presentation, we will talk about how to quantify the environment and to combine multiple data sources to study the interdependencies between Earth and human activities.

IV. From rural to global: space technologies to innovate tourism

Filomena Cuccarese



Filomena Cuccarese has a degree in Economics and Management of Government and International Organizations, at the Bocconi University in Milan.

She started her career as Lecturer for both postgraduate courses and for public sector executives, and as advisory for the energy unit at the Province of Milan.

Since 2000, she has been working in the R&D unit as business developer officer, responsible for the programming and controlling unit, and then as a senior project manager at Openet Technologies S.p.A.

She has managed several R&D projects - included ESA/ASI projects, contracts and relationships - involving both private and public partners at national and international level (i.e. UNDP, FAO, Electoral Commissions in African countries, Department of Education in South Africa, Italian Universities, National Council of Research, National Institute of Astrophysics, CERN, etc.).

Since 2010 she is a journalist registered in the Basilicata region register.

Currently she holds the position of managing director at Openet Technologies S.p.A. and since 2022, she is a scientific communicator at the SPARKme Space Academy.

The SPARKme Space Academy is the result of the SPARKme demonstration project. The Academy represents a significant opportunity for the territory to enrich the tourism offer and visitors experience and contribute to disseminating the scientific culture. The challenges are two-fold:

- a) from a tourist perspective, the Academy does contribute to enriching the local and regional offering by promoting the scientific culture through immersive experiences thanks to ICT and technology-based solutions as well as thematic exhibits. This is also a way to propose an "educational" and "experiential" tourism with an eye towards everything that "space" in a broad sense represents in terms of innovation and

environmental protection. The Academy hosts, within a single structure of approximately 4000 square meters, exhibits and advanced technological systems, including the Planetarium, a 5D cinema and laboratories to offer an immersive journey that starts from Earth and reaches the Moon and then the planet Mars. This journey provides stimulation and knowledge, narrating how space data, space technologies, space exploration, research, and space applications contribute to improving human life and safeguarding our planet. Thanks to the advanced TLC infrastructure available at the Academy, distance live and interactive visits at other cultural, scientific and tourism entities can be activated providing a perspective of global and inclusive tourism.

- a) from the educational side: to promote the outreach education to talk about and share innovation and opportunities linked to the space sector with special regard to the NEXT GEN. Often, even from the feedback received from the students who have visited the Academy, space and everything revolving around, it is considered as a distant world, certainly exciting but also with significant entry barriers. Through the Academy, it is possible to narrate, with the use of advanced technologies (i.e. VR, AI), and thanks to skilled expertise, how those barriers do not exist and how, instead, there are many opportunities to guide one's path of studies and professional career in the space sector.

V. Best Practices for Integrating AstroTectonic's Earth Observation and Seismic Activity Management System in Tourism and Agriculture Sectors.

Noemi Zabari



Dr. Noemi Zabari, an astrophysicist, entrepreneur, and leader, bridging the gap between the scientific and business communities. She completed her Ph.D. in Astrophysics at the Institute of Nuclear Physics of the Polish Academy of Sciences in Krakow. Previously, she pursued simultaneous studies in Applied Mathematics at the University of Science and Technology and Technical Physics at the Cracow University of Technology. During her academic pursuits, she worked at a company developing a nanosatellite constellation for a telecommunications network. Inspired by her scientific explorations and her involvement in a company focused on the impact of space weather on satellite electronic subsystems, she founded and currently is the CEO of Astroteq.ai, a company dedicated to researching cosmic radiation and use of Earth Observation towards seismic activity. She is a technology enthusiast, driven by innovation and its potential to enhance our lives—a fan of a dynamic and positive approach to

life.

As a startup specializing in earthquake AI forecasting and utilizing Earth Observation, we recognize the potential of our system to provide valuable insights and benefits to both the tourism and agriculture industries.

- A. Tourism - significant contribution to the tourism sector by enhancing safety measures, improving planning, and enriching visitor experiences. Here are some best practices showcasing the system's benefits:

1. **Safety and Risk Management:** the system can provide early warnings to tourism authorities, allowing them to take necessary precautions, evacuate vulnerable areas, and ensure the safety of tourists and residents.
 2. **Enhanced Infrastructure Planning:** assistance in tourism businesses and destinations in assessing the seismic vulnerability of existing infrastructure and guiding the design and construction of new facilities to withstand seismic events.
 3. **Tourist Experience and Education:** raising awareness and education by real-time seismic activity information to tourists. Enhancement of understanding of local geology and seismology, adding educational value to their experience and fostering responsible tourism practices.
- B. **Agriculture - significant advantages to the agricultural sector, particularly in terms of risk assessment, resource optimization, and climate change adaptation. Here are the best practices for integrating the system into agriculture:**
1. **Risk Mitigation and Crop Protection:** helping farmers anticipate potential damages caused by earthquakes and take preventive measures to protect their crops, livestock, and agricultural infrastructure.
 2. **Precision Agriculture and Resource Optimization:** contribution to precision agriculture practices. Farmers can utilize seismic activity insights alongside other data layers, such as soil moisture, vegetation cover, and climate variables, to optimize irrigation schedules, fertilizer applications, and crop management strategies.

In summary, by enhancing safety measures, improving planning and infrastructure, and supporting sustainable practices, our system can contribute to the long-term resilience and sustainability of both industries.

VI. Illustrations of advances and innovations in the use of space data and technologies to meet the challenges of agriculture in South-West of Europe

Laurent Augier



General Director of the French innovation cluster on agrifood and agriculture AGRI SUD-OUEST INNOVATION since 3 years. Previously, Scientific Director and Project Director of the same organization. Member of the Board of Directors of some French organizations: Terres Inovia, technical centre for the oilseed and protein crop sector; RobAgri, association for the development and promotion of the agricultural robotics in France. He is also co-leader of the Occitanie region's innovation strategy on agricultural and food issues.

1. ASOI short introduction
2. Agriculture challenges
3. Some illustrations of innovations and advances (EU projects, start-ups, regional innovation strategy...)
4. Openness to future collaborations and projects

VII. Constellr – a satellite mission for agriculture in a time of climate change

Dr. Tobias Leismann, Innovation Lead, tobias.leismann@constellr.com - Matthieu Taymans, Senior Technology Manager, matthieu.taymans@constellr.com

About constellr constellr is a European technology company, providing global monitoring services to the agriculture industry to deliver crucial support for global food security in the face of a changing climate. Spun out from Fraunhofer, Europe's largest research organization for applied science, constellr has developed a solution which can precisely measure surface temperature and inform on crop water needs from space: a constellation of proprietary microsatellites with unique sensing capability and global coverage. constellr's key innovation is a patent-pending architecture to enable high-quality infrared imaging on Microsatellites. Using its proprietary state-of-the-art space infrastructure, constellr measures key environmental quantities such as water, temperature, and carbon cycles with unparalleled precision. constellr is supported by ESA, NASA and the EU and is contributing to the Copernicus program.

Abstract of presentation Water is the single central driver for nearly all of humankind's food production. As a result, today, more than 70% of all freshwater is used in irrigation. As water use and water need is currently not quantifiable reliably in an economically scalable way, more than 60% of this water is wasted. To support the stabilisation of the global food supply chain, it is therefore essential that new, scalable, and affordable data sources are made available, with an actionable degree of timeliness and accuracy. Since current satellites are not fit for purpose, constellr is building a proprietary satellite constellation to provide global land surface temperature (LST) imagery. Specifically, we offer a timely delivery of direct sub-field level LST, optimized for high-precision agriculture monitoring, crop water use, temperature-derived crop health management, yield forecasting, sustainable resource management and soil organic content. We will demonstrate use cases which verify, that these measurements have the potential to substantially optimize water productivity in agriculture. As an outlook we will be able to show how our land surface temperature data can also be put to work for mitigating the growing challenges posed by urban heat islands.

VIII. Continuous Monitoring of Agricultural Crops - Use case application on vineyards

Alessandro Gentile

MONitoraggio di Colture Agricole Permanente (MONICAP) The MONICAP project, designed by Intecs in collaboration with CIRA and Consorzio Hypazia, is a system which aims to guarantee and facilitate access of the farmers to real time information derived from the analysis of Earth Observation images, providing a system that allows permanent monitoring on the cultivated area. To carry out this task, the system uses an aerostatic platform and meteorological and satellite data. The architecture which allows to perform the requested functionalities is made by a flying element, balloon and the payload, equipped by a multi/hyperspectral sensor, a thermal and a visible chamber, and by a ground element, which contains the storage equipment. The real time images, acquired by high-resolution remote sensing and proximity sensors, give proper information that will be used in order to proceed with proper irrigation and fertilization procedures even with an important economic advantage, through the minimization of the waste of water resources and the drastic reduction in pollution thanks to the decrease of the used amount of chemical fertilizers. In particular, the MONICAP system addresses the precision viticulture sector by providing to the end users several fast, cheap and reliable diagnostic tools for

monitoring the variability of parameters and agronomic indices of plants under observation in a precise and automatic way. Through the high-frequency acquisition of visible, near infrared, thermal and multispectral images from a fixed location, it is possible to identify anomalies associated with abiotic stress (water and/or nutritional deficiency) or phytosanitary problems.

IX. Digital and space solutions for agriculture: case of AgriTrack Full DSS Stack (development in progress within ESA InCubed program)

Andrea Cruciani

Today agricultural players face with different problems and risks, e.g. climate change and biodiversity loss, changing of consumers' tastes and expectations, pests and infectious crop diseases, limited land resources, broken supply chain etc., therefore in order to be successful and stay resilient against global economic factors they have to invest in farm productivity and adopt and learn new technologies, minimizing, at the same time, the environmental impact and, therefore, maximizing economic and environmental sustainability. Currently, Agricolus is working on setting up an advanced full decision support system called AgriTrack Full DSS, which combines modeling and remote sensing historical information to diagnose the hot-spots of vegetative stress highlighted by remote sensing. AgriTrack full DSS is a solution for multiple farm management developed within Agricolus ecosystem aimed to help farmers' associations, cooperatives, consortia tackle the above-mentioned problems in an efficient way. AgriTrack full DSS wants to overcome two common problems of agricultural DSSs: the information overload and the lack of spatial information of the prescriptions. AgriTrack Full DSS is an ecosystem that is going to enable a new generation of full DSSs functionalities: integrating remote sensing data, data from tractors, IoT sensors, forecasting model, land uses, weather information, soil conditions, crop scouting and crop operations. All the information (both punctual and spatial) will be correlated providing a proper data spatialization when needed, to have new generation and highly valuable insights obtained from the correlation of all the data sources. This approach is a novelty in the market and can really support AI processes that can provide suggestions that are often hidden in different data domain and that today are most of the time not related one to the other.

X. LA.U.R.A. Latitudo Unmanned Rover for Agriculture solution

Mauro Manente



Mauro Manente is a software engineer with several IT and project management certifications. He is the founder and co-founder of several start-ups. He worked for over 15 years in technology companies related to the development of mission critical solutions for the space and environmental monitoring sector, developing the topics of cloud platforms and the application of artificial intelligence, big data and machine learning in different sectors and business processes. From 2010 to 2016, he was COO and BoD member of Remocean, a start-up-Spin-Off of the National Research Council (CNR) that developed an innovative system to determine sea state parameters from X-band radars. Since 2000, he has collaborated in several projects funded by the European Union - IV, V, VI, VII Framework Programme, H2020. Mauro Manente is COO of

Latitudo 40 and is responsible within Latitudo 40 for the entire organisation of project activities and company operations in general, also providing support in marketing activities.

The LA.U.R.A. (Latitudo Unmanned Rover for Automatic Inspection) project was born as an evolutionary project of the Latitudo 40 Agrialytics platform for monitoring solutions in agriculture using satellite remote sensing images and artificial intelligence algorithms. The platform currently in operation is schematically represented in the figure below.



The innovation project starts from the consideration that satellite monitoring solutions are currently only sometimes able to answer all customers' information needs, especially for farms active in fruit production and viticulture and for insurance companies that have to carry out checks in agriculture after a claim.

The data from our satellite processing must be supplemented by analyses in the field with specialised personnel. To accelerate the scalability of the solution and to make the data acquisition process more efficient, **Latitudo 40 has developed a model to automate the data collection process in the field (especially in agriculture) through an autonomous vehicle (which can be transferred to different clients for data collection campaigns) equipped with the latest generation of sensors (lidar equipment, 360° high-resolution camera, precision positioning systems, autonomous and remote guidance).**



Figure 2 PROTOTYPE OF LA.U.R.A. ROVER

The Rover vehicle is just one part of the complex integrated system designed by our company. Latitudo 40 has started technological development to

- Integrate optical (camera) and laser (LIDAR) sensors to analyse the context of the operations
- Integrate a 5G communication system to ensure communication and interoperability of the Robot with the central cloud platform
- Ensure the development of an autonomous driving capability of the robot within the identified area through the processing of satellite images with a new AI based algorithm
- Manage the possibility of remote guidance through a specific control interface

The most innovative element of the solution is related to integration with Latitudo 40's satellite image processing and analysis platform. The integrated system has the following functions:

- Acquire area from satellite image
- Define the route for field analysis activities (mission definition)
- Send information to the rover via a 5G connection (mission scheduling)
- Receive the information from the rover and correct any guidance errors (mission control)
- Transmission of all images and information collected within the Latitudo 40 cloud platform

XI. Fusion of Remote Sensing and Geospatial Data: Enhancing Information Capacity for Agricultural Crop Monitoring

Krystyna Michałowska

Modern agriculture relies heavily on accurate and timely information to optimize crop management and increase productivity. Remote sensing and geospatial data have emerged as valuable sources of information for agricultural monitoring, offering high-resolution and comprehensive coverage of agricultural landscapes. However, the effectiveness of individual data sources can be limited by factors such as cloud cover and temporal resolution.

To overcome these limitations and enhance the information capacity for agricultural crop monitoring, we propose a fusion approach that integrates remote sensing data with geospatial information. By combining data from diverse sensors, such as optical and Synthetic Aperture Radar (SAR) satellites, with geospatial data containing terrain, soil, and climatic parameters, we create a more robust and detailed dataset.

The fusion of remote sensing and geospatial data enables a comprehensive analysis of crop conditions, growth patterns, and environmental factors, providing valuable insights for precision agriculture. This approach allows for real-time monitoring and more accurate decision-making regarding irrigation, fertilization, and pest control, leading to improved crop yields and resource management.

The presented fusion methodology demonstrates its potential to agricultural crop monitoring by leveraging the strengths of different data sources. It offers a pathway for sustainable agriculture and contributes to food security by optimizing agricultural practices and resource utilization. The integration of remote sensing and geospatial data is a promising step towards meeting the challenges of modern agriculture and fostering a more efficient and resilient farming sector.

XII. Canopy cover dynamics in dieback affected oak forests captured by phenological behavior

Maria Castellaneta, Angelo Rita, Marco Borghetti, Emanuele Ciancia, Guido Masiello, Antonio Saracino, Francesco Ripullone.*



Maria Castellaneta is a PhD in “Agricultural, Forest and Food Sciences” at the University of Basilicata. Her research activity aims to assessing and monitoring the forest vulnerability and its capacity of recovery after the occurrence of extreme climatic events in order to provide informations needed to safeguard the forest systems, through a combined approach (ground-based and satellite data). She is co-founder of the SilvaCuore, the first App designed in Italy to report the forests health status: the support of an active users’ community can not only allow researchers to survey declining forest sites, but also to better plan research activities and management measures. She is involved in different research projects aimed to investigate the potential drivers of forest decline and mortality in the Mediterranean environment.

Rising aridity, mostly driven by higher temperatures and reduced precipitation, will likely undermine the health status of forest ecosystems. Experiments and observations point to the likelihood that if climate changes proceed at its current rate, the resilience of many forests will be threatened by altering their structure and functions and reducing their capability to provide ecosystem services. Vegetation phenology has been widely recognized as an important tool for tracking the timing of seasonal activities of plants, as well as changes in forest ecosystems in response to climate change. In this work, we sought to detect the phenological behavior of Mediterranean forest stands showing evident die-off symptoms. We investigated how a phenological spectral index for *Quercus cerris*, *Quercus pubescens*, and *Quercus frainetto* stands would be able to reflect the seasonal vegetative dynamics of forests affected by dieback. To this purpose, we compared nearby stands exhibiting different vigor, i.e., dieback vs

non-dieback, assessed as severe defoliation growths decline, and higher tree mortality rate. Phenological metrics of Plant Phenology Index (PPI) were derived from Sentinel 2 satellite. The results indicated peculiar site-specific phenological patterns. Our findings may provide new insights on phenological response to climate change in semi-arid regions, highlighting how trees, showing clear symptoms of decline, may keep their vital activities by changing their phenological performance. What described above leads to a crucial question concerning the potential implications of observed phenological shifts on the global carbon and water balance of terrestrial ecosystems under future climate change. Hence, in the coming years, this study could provide a more comprehensive overview on climate-vegetation interactions, mainly in the Mediterranean Basin, where intensified global warming and aridification trends are expected.

XIII. Territorial Basic Knowledge Acquisition: TEBAKA

Vincenzo D'Avino

In the field of agriculture, the Aerospace Technology District will present the experience of the TEBAKA project, which, together with the REDOX (Remote Early Detection of Xylella) project, currently represent the main research focus in the sector. The aim of the research project is - the definition of a methodology to achieve knowledge relating to the agricultural crops of wheat, vine and olive, - the realisation of an integrated multiscale platform for the management of observations (data), and - the design of a service framework for growers that, in an easy and economically sustainable manner, provides correct information to support the management of the annual production cycle. In this context, acquisitions from different sensor systems are integrated: systematic via satellites, largescale via aircraft and detailed and localised via drones and ground rovers. The expected result is the realisation of an innovative product/service prototype (architecture and operational framework) for the farming industry to provide structured knowledge and acquisition tools. In this way, it will be possible to support decision-making in the early stages of potential and/or manifest criticalities and guide the best subsequent mitigation or recovery actions. The solution allows both private companies and public agencies to design services with high added value.

XIV. Agrifood systems in the new climate trend

Marco Folegani

Earth Observation products, combined with Climate data and Climate scenarios, can support the adaptation of the agrifood sector to the future climate conditions by anticipating climate trends and by suggesting proper Agritech solutions to improve the climate resilience.

XV. PROTECT - Preparing a Pre-Commercial PROcurement for end-user services based on environmenTal obsErvation in the area of Climate change adapTation and mitigation

Ioana-Simona Rosca

Space-based Earth Observation providers have been acknowledged as key stakeholders in understanding and meeting the demands of public authorities in the field of climate change. Space-based Earth Observation services are essential inputs for actions related to climate research, monitoring, adaptation, mitigation, and risk reduction. Although the European Union (EU) is a major source of space-based Earth Observation data, due to a lack of awareness, expertise, or abilities, public authorities do not always make effective use of these data. This is especially important for Member States with low resources, as they have the highest need for local climate information.

In this context, the EU-funded PROTECT project aims to support European public authorities in their climate change adaptation and mitigation efforts through the procurement of R&D (XXX) services for innovative climate services. PROTECT brings together a community of European public authorities – and specifically public buyers - to facilitate the definition and aggregation of their needs and requirements for Climate Services and prepare an upcoming Pre-Commercial Procurement (PCP). PROTECT will also support the upskilling of public authorities by providing them with free awareness-raising and capacity-building activities in the area of innovation procurement, climate change adaptation, Earth-Observation applications, and climate services taxonomy. The application domains that PROTECT is focusing on are Marine and Coastal Environment, Civil Security and Protection, Agriculture, Forestry and Other Land Uses, Energy and Utilities and Sustainable Urban Communities.

This presentation will first explain the PROTECT Coordination support Action (CSA) project, as the preparatory phase for an upcoming PCP, followed by an explanation of the PCP approach, the process and its characteristics. The role of Climate Services providers and public authorities, in particular during the Open Market Consultation will be addressed. As a result of PROTECT, public authorities, contracting authorities/entities will have clearly defined their Climate Service needs based on Earth Observation and have a more accurate knowledge about the current and upcoming technologies that the market has to offer. On the other hand, Climate Service providers will be able to concretely understand the needs of the public authorities, contracting authorities/entities in order to be best positioned for the upcoming PCP where 19M Euros will be available for financing R&D activities.