



REPUBLIC OF CROATIA  
Ministry of Science  
and Education



Hrvatsko predsjedanje  
Croatian Presidency of the  
Vijećem Europske unije  
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# EO & GI – new businesses, new jobs, new professions

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## Challenge

- *Business environment is, due to technological revolution, changing dramatically*
- *Globalization has additionally reallocated many industries and businesses*
- *Numerous jobs disappeared in recent years*
- *New jobs requiring new skills and knowledge have arisen*
- *New jobs professionals don't exist*
- *Educational system struggles to cope with fast changes*



*Law of disruption – that technology develops exponentially while social, economic and legal systems change incrementally! (Downes, L; 2000)*

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## Creation of present jobs

In other words –  
teacher?

***Machine learning engineer***

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*Machine learning engineer*

*Factoring specialist*

Didn't we call it  
debt collector?

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A bit too much  
for me...

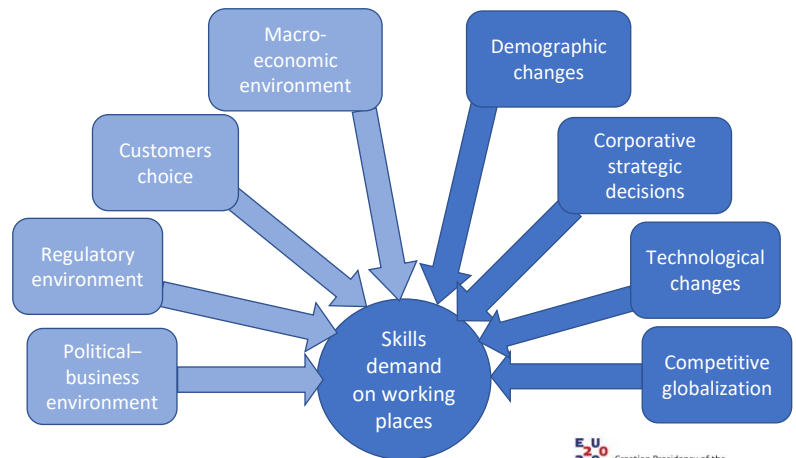
*Influencer*  
*(Social media manager)*

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## Future jobs

- *Influenced by many factors*
- *Some of them contradicts*
- *Job creation speeded up*
- *Jobs life expectation become shorter*
- *Therefore, future jobs are hard for predict*

## Skills needs on working places (UK Commission for Employment and Skills, 2014.)



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## EO & GI sector

- *Incorporating:*
  - *Space technologies – Earth observation & Satellite positioning and navigation*
  - *ICT technologies – machine learning, artificial intelligence, big data*
  - *Geo-spatial (geoinformatic) application development*
- *Characterized with fast growth and great economic potential*
- *Incorporated in many new business areas: smart cities, precise farming, intelligent transportation, sustainable environment, climate changes, spatial management on all levels, etc.*

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## GNSS

- *Big business with clear perspective*
- *Took 45 years to achieve present level*
- *Major milestones:*
  - *1984 – GPS allowed for civilian use (free of charge)*
  - *1989 – First hand-held GPS receiver launched*
  - *1999 – First GPS incorporated commercial mobile phone launched*
  - *2019 – 6,4 billion GNSS devices worldwide (1 billion Galileo enabled)*
- *Enabled new dimensions in geo-spatial domain ... together with GIS induced emergence of geoinformatic*



## GNSS

*According to GNSS Market Report, Issue 6, 2019:*

- *EU share of the overall global GNSS market will grow with development of Galileo*
- *Major growth is expected in GNSS added-value services*
- *Drones and Space become significant GNSS market segment*
- *Resulting in:*
  - *Various jobs in hardware manufacturing*
  - *Even more jobs in application and added-value services development*



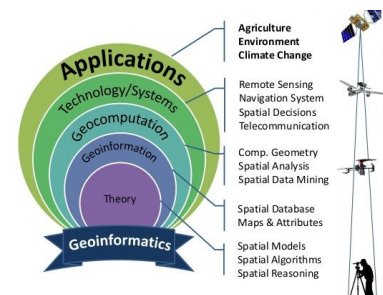
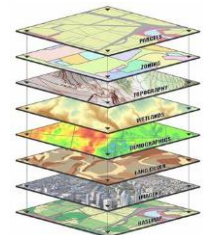
## Earth Observation

- *Major (with GNSS comparable) milestones:*
  - 1959 – First pictures of earth taken from satellite (Explorer 6)
  - 2014 – Copernicus operations released with free data access
  - 2018 – 300.000 Copernicus users reached
  - 2019 – half of the Sentinels constellation established
- *Anticipated big business, should double till 2027*
- *Still does not realize its full potential – user uptake issues*



## GIS / Geoinformatics

- *Unclear definitions about GIS / Geoinformatics market*
- *The global GIS market was valued at 10,8 billion US\$ in 2018 and is anticipated to double till 2025 (Prescient & Strategic Intelligence, 2019)*
- *Geoinformatics market undefined due to weak definition of geoinformatics itself*



## GNSS, EO & geoinformatics

- *Essential elements in development and implementation of dominant geo-related concepts like:*
  - *Smart cities*
  - *Intelligent transportation*
  - *Precise farming*
  - *Sustainable environment*
  - *Internet of things*
  - ...



## Identified challenges

- *Lack of common understanding resulting in inability to communicate between professions*
- *Lack of unified (basic) approach EO / GI and related areas education*
- *Undefined future occupations in EO / GI field*
- *Undefined skills and knowledge necessary for future professionals in EO / GI field*
  
- *Dynamic in addressing identified challenges is essential for creation of future jobs and business development*

## Education and EO & GI

- *Educational system struggles to cope with fast technological changes*
- *While GI studies already exist for several years, first EO studies are under development*
- *Neither GI or EO occupations are properly defined in EQF*

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## Communication issues

- *Different approaches to technology driven concepts in educational processes for different professions results in inability to communicate*
- *Example:*
  - *Erasmus+ CBHE BESTSDI project*
  - *Objective: to introduce Spatial Data Infrastructure in study programs of 10 different professions*
  - *Unexpected challenge: understanding Spatial Data Infrastructure concept between professions*
  - *Took a year to bring different professions to common understanding of concept and its relevance*

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## User requirement and (education) strategy

- *EO / GI business sector is still under development challenging clear picture about user requirements towards educational system*
- *Challenging development of uptake strategy*
- *Example:*
  - *Erasmus+ SSA EO4GEO project - Towards an innovative strategy for skills development and capacity building in the space geo-information sector supporting Copernicus User Uptake*
  - *Objective: maximizing the socio-economic benefits of Copernicus*
  - *Challenge: geospatial data (including EO) are difficult to use by non-experts*



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## EO4GEO outlines

- *EO4GEO aims to help bridging the skills gap between supply and demand of education and training in the **space/geospatial sector** by reinforcing the existing ecosystem and fostering the uptake and integration of space/geospatial data and services in end-user applications.*
- *EO4GEO works in an multi-and interdisciplinary way and apply innovative solutions for its education and training actions including: case based and collaborative learning scenarios; learning-while-doing in a living lab environment; on-the-job training; the co-creation of knowledge, skills and competencies; etc.*
- *EO4GEO will define a long-term and sustainable strategy to fill the gap between supply of and demand for space/geospatial education and training taking into account the current and expected technological and non-technological developments in the space/geospatial and related sectors (e.g. ICT).*



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## EO4GEO activities

*The strategy will be implemented by:*

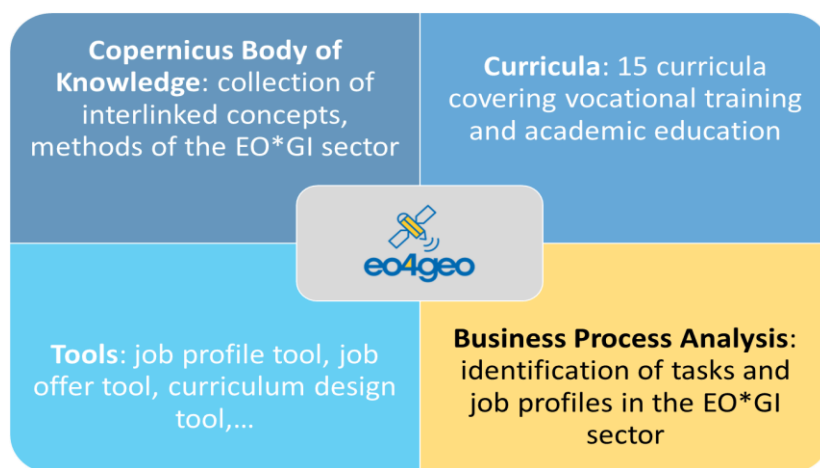
- *creating and maintaining an ontology-based Body of Knowledge for the space/geospatial sector based on previous efforts;*
- *developing and integrating a dynamic collaborative platform with associated tools;*
- *Designing and developing a series of curricula and a rich portfolio of training modules directly usable in the context of Copernicus and other relevant programmes;*
- *conducting a series of training actions for a selected set of scenario's in the three sub-sectors -integrated applications, smart cities and climate change to test and validate the approach.*

*A long-term Action Plan will be developed and endorsed to roll-out and sustain the proposed solutions.*



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## Interwoven components



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## Connecting practice and education

- *Fast technological development challenges capacity of educational institutions to deliver practical skills to students necessary for business sector*
- *Example:*
  - *Erasmus+ CBHE GEOBIZ project – Business driven problem-based learning for academic excellence in geoinformatics*
  - *Business and academic institutions cooperation should deliver new forms of practical learning which will introduce new and necessary skills in educational process in EO and GI field*
  - *Real sector cases should be introduced in teaching process in upgradable manner using new forms of education (blended mobility, etc.)*



## New businesses, new jobs, new professions

- *New business environment in EO / GI field will continue to develop with high speed creating new jobs*
- *Global competitiveness of European EO / GI business environment will depend on our ability to create and deliver professionals with new skills and knowledge necessary for new jobs*
- *This is relevant on all educational levels as well as for VET education*
- *The race between technological revolution and our capacity to provide new professionals should result in additional efforts to develop adequate educational capacities which will satisfy needs of real sector*



**Thanks for your attention**

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