This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant agreement No 724034

AERO-UA

EU-Ukraine collaboration in aviation research

Dr. Lina Smovziuk,
National Aerospace University "KhAI"

Information and Networking Event in Zaporizhia
25 April 2019

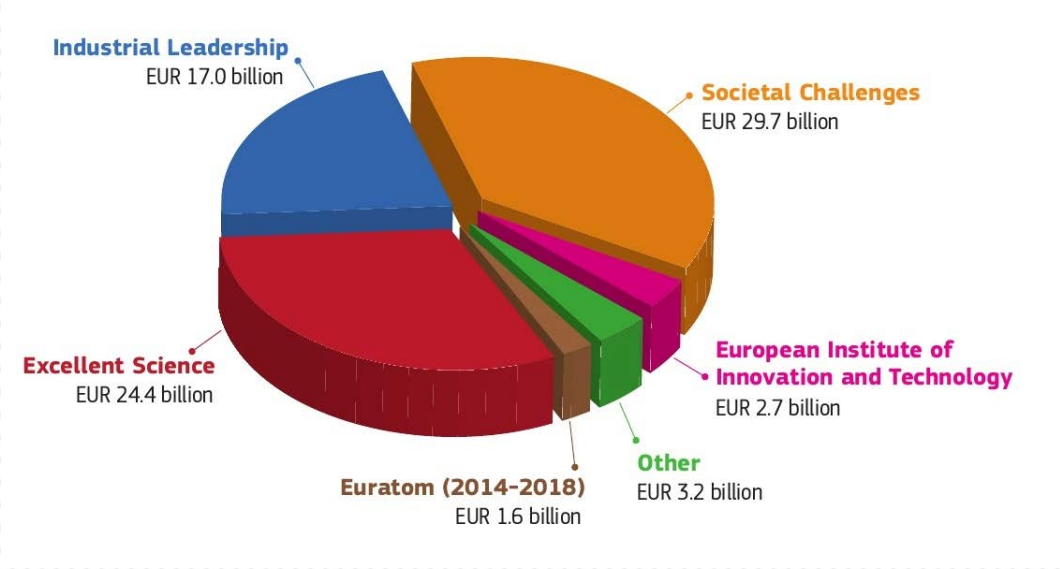
AERO-UA

Excellent science. Competitive industries. Better society

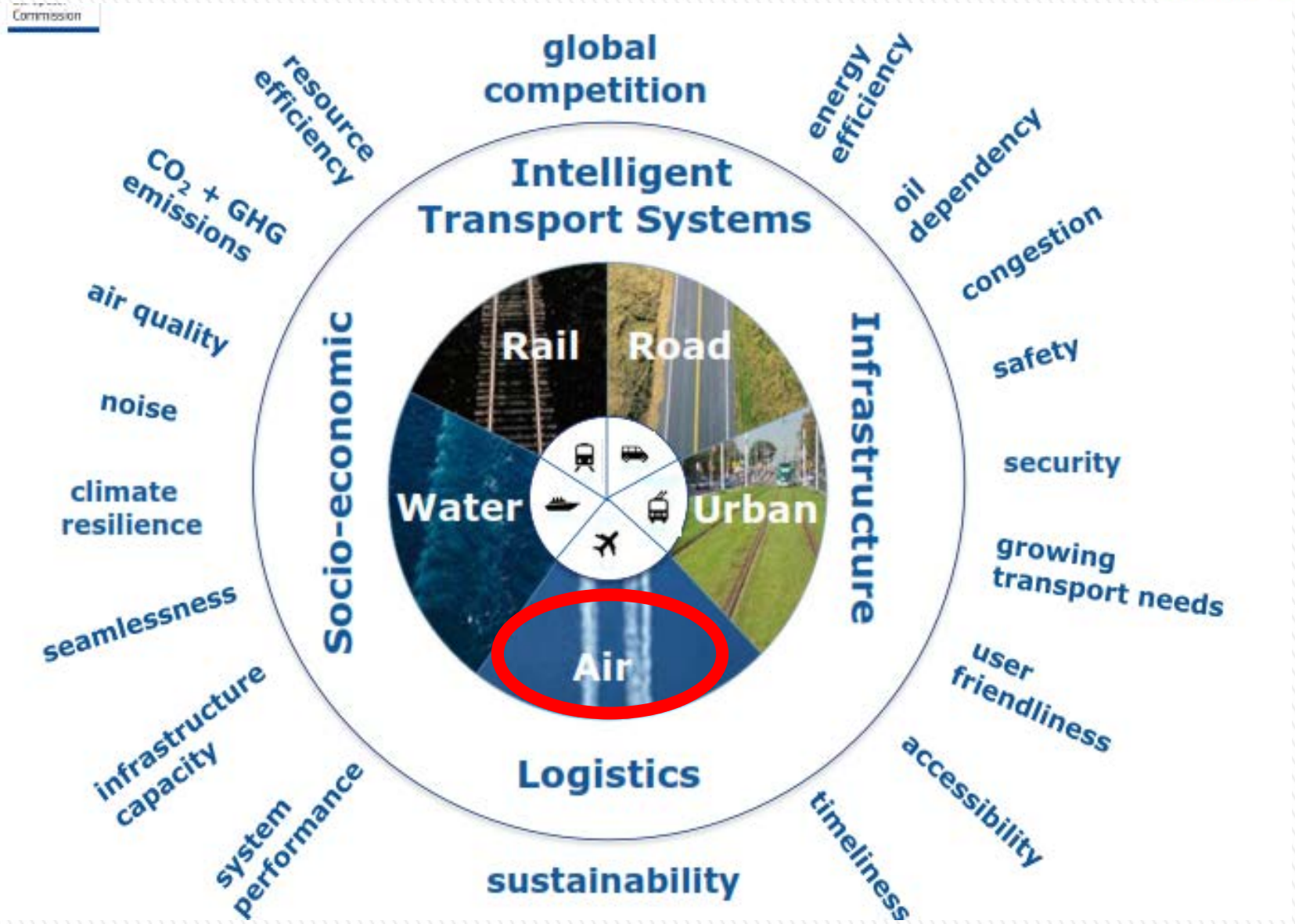
77 bln € for 2014 – 2020

H2020 Pillars:

1. Excellent science
2. Industrial leadership
3. Societal challenges

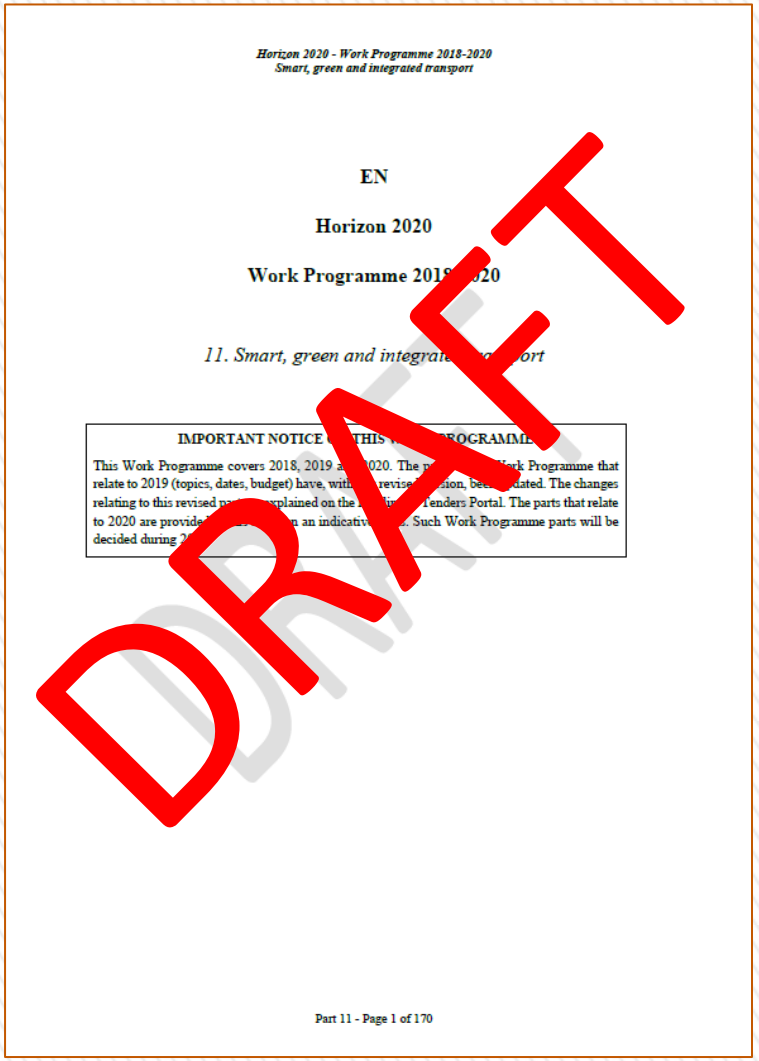


Societal Challenge
“Smart, Green and Integrated Transport”



Smart, Green and Integrated Transport: Work Programme 2018-2020

- Basic multi-year document
- Structure:
  - → Call (Mobility for Growth, Green Vehicles…)
    - → Topic (MG-1-1, GV-8, …)
- **24 new topics for 2020**
- 2020 overall indicative budget –> 295.5 M€
- Official publication –> Summer 2019



Aviation-oriented transport topics for 2020

- LC-MG-1-15-2020: Towards sustainable high-speed global air transportation
- MG-3-4-2020: Innovative electric network architectures and systems, optimising global energy, electrical power, data and communication for aviation
- MG-3-5-2020: Next generation multifunctional and intelligent aero-structures, with emphasis on manufacturing, maintenance and recycling
- MG-3-6-2020: Towards sustainable urban air mobility

LC-MG-1-15-2020: Towards sustainable high-speed global air transportation

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Challenge:

- to act promptly and shape together with the international community high environmental standards to certify civil supersonic aircraft operations

- to understand better the combined and interdependent environmental impacts of potential supersonic aviation on citizens

Scope (address 2 or more of the following areas):

» holistic environmental impact of potential supersonic aviation

» high-fidelity environmental modelling + multi-disciplinary optimization of supersonic aircraft, trajectories and operations

» sonic boom shaping to decrease noise and all kind of emissions at airport/local and global level

» sonic boom variability due to climate, meteorology, turbulence, urban environment, buildings

» modelling tools that capture the physics of sonic booms creation and propagation + metrics for measuring indoor boom annoyance

RIA projects

3…5 M€

Collaboration with ESA, ICAO, int. organizations

MG-3-4-2020: Innovative electric network architectures and systems, optimising global energy, electrical power, data and communication for aviation

AERO-UA

Challenge:

- Innovative solutions towards optimising electrical power, data, communication and processing networks in More Electric Aircraft (MEA)

- Weight & cost reduction, harness simplification, versatility and scaling, high-speed connectivity, without jeopardising safety and security.

Scope (address at least 2 of the following areas):

» Next generation modular and distributed power data and wireless networks, enabling cable weight reduction and harness optimization

» Advanced technologies for electrical heat dissipation

» Safe, secure, robust and reliable connectivity solutions, including advancements in unified data models, resilience to connection loss and cybersecurity specific barriers

» Advancements in interface standardization with emphasis on software independency, modularity, portability, and standard hardware platforms

» Fundamental research on artificial intelligence and data driven technologies and their applications for future aircraft electric network architectures and systems.

RIA projects

2…4 M€

Synergy with Clean Sky, SESAR, ECSEL, Galileo, EGNOS, HPC, Big Data & Artificial Intelligence initiatives

MG-3-5-2020: Next generation multifunctional and intelligent aero-structures, with emphasis on manufacturing, maintenance and recycling (1)

Challenge:

- Technologies-of-interest: morphing aerodynamic surfaces, structural health monitoring and multi-functional structures.

- Focus: tailoring of these technologies to respond aeronautical requirements: variable production rates, quality targets, automated assembly processes, smart repair, ecological dismantling and recycling

Scope (address 2 or more of the following areas):

» Manufacturing technologies & processes for flexible wing with morphing capabilities to adapt their shape in low-speed aircraft configurations.

» Innovative joining technologies + damage diagnostics for composites & dissimilar materials in primary and secondary aircraft structures to offer substantial benefits towards reduced weight, while allowing for faster and leaner integration and repair.

» Manufacturing processes for composite, multifunctional and intelligent aero-structures to cover the whole production chain + to support activities such multi-disciplinary optimisation (process-product-performance) of production, smart tooling and on-line quality control.

RIA projects

3…5 M€

TRL 2…4

Complementarity with projects funded in 2018 & 2019

MG-3-5-2020: Next generation multifunctional and intelligent aero-structures, with emphasis on manufacturing, maintenance and recycling (2)

Challenge:

- Technologies-of-interest: morphing aerodynamic surfaces, structural health monitoring and multi-functional structures.

- Focus: tailoring of these technologies to respond aeronautical requirements: variable production rates, quality targets, automated assembly processes, smart repair, ecological dismantling and recycling

Scope (address 2 or more of the following areas):

» Advanced quality monitoring and on-line process control of the manufacturing/maintenance/repair processes for increased rates.

» Integrated technologies and methodologies towards next generation health management and monitoring, together with sensor development, wireless networks and data-driven fault detection.

» New MRO and recycling technologies for multifunctional and intelligent aero-structures.

RIA projects

3…5 M€

TRL 2…4

Complementarity with projects funded in 2018 & 2019

MG-3-6-2020: Towards sustainable urban air mobility - UAM (1)

Challenge:

- To make urban air mobility not only safe, secure, quiet and green but also more accessible, faster, affordable, inclusive and publicly accepted.

- Cross-disciplinary research to enable aerial traffic in the urban environment.

Scope (address 1 or more of the optional areas):

» (A) Services: new door-to-door or emergency services concepts allowing UAM traffic + new approaches for regulatory due processes associated to the sign-off of urban air services.

» (B) Operations: new concepts of operations allowing UAM traffic to be interwoven with the multi-modal urban transportation or emergency systems (e.g. ground/air ambulances).

» (E) Power-plant/propulsion system: high power/weight ratio, fast battery recharge/fuel-cell refill, high level of reliability and fail-safety and low level of noise, emissions and maintenance requirements.

» (F) Infrastructure: adaptation, evolution and integration into transport, energy and ICT networks.

RIA projects

3…5 M€

TRL up to 6

Complementarity with European U-space Demo Network, SESAR JU U-space activities, etc.

MG-3-6-2020: Towards sustainable urban air mobility – UAM (2)

Challenge:

- To make urban air mobility not only safe, secure, quiet and green but also more accessible, faster, affordable, inclusive and publicly accepted.

- Cross-disciplinary research to enable aerial traffic in the urban environment.

Scope (address both compulsory areas):

» (C) Safety and security: airworthiness considering innovative technologies, adverse weather/airflow conditions at low altitudes, human factors and automation, collision and avoidance; electro-magnetic compatibility; detection and surveillance of physical/cyber threats, prevention, preparedness, response and recovery from threats; and/or other relevant hazards and threats.

» (G) Public acceptance, socio-economic, regulatory and organisational aspects: focus on noise, visual pollution, privacy, shared-use, land-use, liability, safety and security of operations, dedicated certification schemes. Co-creation and involvement of citizens is required. Policy recommendations should also include procurement and deployment strategies.

RIA projects

3…5 M€

TRL up to 6

Complementarity with European U-space Demo Network, SESAR JU U-space activities, etc.

Multidisciplinary transport topics for 2020

- **LC-MG-1-12-2020: Cities as climate-resilient, connected multimodal nodes for smart and clean mobility: new approaches towards demonstrating and testing innovative solutions**
- **LC-MG-1-14-2020: Understanding and mitigating the effects on public health of emerging non-regulated nanoparticle emissions issues and noise**
- **MG-2-14-2020: The effects of automation on the transport labour force, future working conditions and skills requirements**

Other opportunities in H2020 for aeronautic experts

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HORIZON 2020
THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

Excellent Science

- ⇨ - European Research Council
- ⇨ - Future and Emerging Technologies
- ⇨ - Marie Skłodowska-Curie Actions
- - Infrastructures

Industrial Leadership

- - Leadership in Enabling and Industrial Technologies (LEIT)
- ⇨ i. ICT
- ⇨ ii. Nanotechnologies, Advanced materials, Biotechnology and Advanced manufacturing (FOF), Process Industry (SPIRE)
- iii. Space
- - Access to risk finance
- ⇨ - Innovation in SMEs

Societal Challenges

- - Health, demographic change and well-being
- - Food security, sustainable ...
- ⇨ - Secure, clean and efficient energy
- - Smart, green and integrated Transport (8.25%)
- ⇨ - Climate action, environment, resource efficiency and raw materials

- ⇨ - Secure societies
- - Europe in a changing world

- ⇨ - Spreading excellence and widening participation
- - Science with and for society
- - Cross-cutting activties

- - Fast Track to Innovations
- - Dissemination, Exploitation and Evaluation

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Contacts:

Dr. Lina Smovziuk

National Aerospace University "KhAI"
l.Smovziuk@khai.edu
+38 (057) 788 40 22
17 Chkalova str.
Kharkiv, 6170, Ukriane

www.aero-ua.eu

Smart, Green and Integrated Transport: Work Programme 2018-2020

Mobility for Growth (MG)

- LOW-CARBON & SUSTAINABLE TRANSPORT
- SAFE, INTEGRATED & RESILIENT TRANSPORT SYSTEMS
- GLOBAL LEADERSHIP & COMPETITIVENESS
- ACCOUNTING FOR THE PEOPLE
- BLUE GROWTH
- Automated Road Transport (ART)
- Green Vehicles (GV)

WHO can participate in H2020?

- Higher Education Establishments
- Research Entity
- Industry
- Small or Medium Enterprise
- Public Authority, NGO
- Natural persons

BUT:

- ✓ Advanced Science
- ✓ Innovative Business
- ✓ In line with H2020 priorities