

ESA Overview – Mission Goals and Programmes Relevant to Health

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ESA Space **E**xploration: **V**ision and **G**oals





European Space Agency

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ESA Open Innovation Exchange: Goals





- Increase awareness among stakeholders
- Disrupt barriers to unlock resources
- Explore opportunities for partnerships
- Address strategy for humankind's benefits
- Strengthen European collaborations to serve Global Challenges



- Space for Inspiration, 14-15 September 2016
 - ESA Closed Habitats Forum, 9-10 –June 2016
 - ESA ROBEX, 15 November 2016
 - ESA Innovation Exchange B2B

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• A pillar of the engagement strategy

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ESA and **Sustainable Development Goals**









Broad partnerships across programmes with other agencies, industry and institutions

Integrated

Applications

Copernicus

Inspiration



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Human Spaceflight and Robotic Exploration: SciSpacE - Science, Applications and Exploration



- Science and Applications programme uses a variety of ground and space platforms for research
- 1500 scientists from across the world and Europe involved in 200 projects. 60 industrial partners involved in project
- Support networks and interdisciplinary research
- Microgravity applications programme to foster applied research
- Research objectives until 2024 defined in science
 roadmaps elaborated with science community
 relevant to both Exploration and Terrestrial needs,
 several of which address Health topics





Human Spaceflight and Robotic Exploration





Health Issues

Terrestrial & Space Exploration:

- Cardiovascular, Bone Muscle, Immune system
- Radiation biology and protection
- Countermeasures
- Diagnostic techniques, medical monitoring, technology





Human Spaceflight and Robotic Exploration





Regenerative Life Support Systems Terrestrial:

- Food production in confined environment
- Water Purification / treatment techniques **Space Exploration:**
- Life Support Elements for Deep Space Habitat





Space Medicine Office – 'ready for launch'







Technical & Quality Management 2 More 3 More 6 MANAGEMEN 7 MERGEMEN 9 MONATIONAND 10 MONATION 11 MANAGEMENT 12 MONAGEMENT



• Transversal activities – Pivotal role in ESA's health-related activities



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Health in Space (for Astronauts) via technological development

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- To prevent & manage medical emergencies during manned missions (Needs provided by MEDical OPerationS team)
- To preserve & protect astronaut's psychological, physiological & physical capabilities (musculoskeletal, cardiovascular, neurovestibular...) via countermeasures and physiological monitoring systems
- To provide instruments / critical technologies for supporting scientific experiments and research

Supporting ESA projects where Space is used for Health on the ground (for Citizens)

- Provision of knowledge and experience on medical technologies and processes for health-related activities sponsored by other ESA programmes (e.g. HRE, TIA)
- Expertise covering the whole medical chain (prevention, monitoring, diagnosis & treatment)



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Technical & Quality Management

- TRP Programme
 - \checkmark developments of technologies with low TRL (1-4), basic R&D
 - Mandatory programme \checkmark
 - Activities implemented through competitive tenders \checkmark
- **GSTP** Programme
 - \checkmark developments of technologies with higher TRL (>4), technology maturation
 - Optional programme \checkmark
 - Activities implemented through competitive tenders or direct negotiation





Bone & muscle modelling

Telecommunications & **I**ntegrated **A**pplications





ESA's Telecommunications & Integrated Applications programmes have a dual purpose:

- To enhance the competitiveness of Industry by means of Research Development and Innovation of Satcom products, services and applications
- To contribute to the resolution of problems that affect the European Institutions and the European society at large

ARTES - Advanced Research on TElecommunication Satellite Systems (Optional programmes)

- **ARTES IAP**: user driven + 2 space assets
- **ARTES C&G**: industry driven + satcom based



Telemedicine represents more than 50% of ESA's 180 health projects

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Telecommunications & **I**ntegrated **A**pplications





IAP MISSION: Space for Daily Life incl. Space for Health

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Telecommunications & **I**ntegrated **A**pplications





Fighting Ebola with a transportable connected biological laboratory – B-LiFE (ARTES IAP)



Remote monitoring - AMAZON (ARTES IAP)



Connected ambulances - SATCARE (ARTES C&G)



Technology Transfer Programme Office

SPACE

TECHNOLOGIES

8 DECENT WORK AND ECONOMIC GROWTH INNOVATION AND

17 PARTNERSHIPS



Mission

Inspire & Facilitate

the use of space technology, systems and know-how for nonspace applications

Strengthen European Capabilities

by identifying new business opportunities for providers of space technology and systems as well as enhancing its know-how and competitiveness

Boost Local Economy

by creating jobs, investing in startups and supporting sustainable innovation

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Technology Transfer Programme Office

ESA PATENT PORTFOLIO	BROKER NETWORK	BUSINESS INCUBATION	AMBASSADOR PLATFORM	space solutions	
inventions covered by 411 patents	BROKERS 320 TRANSFERS	CENTRES 130 new start-ups p/y 400+ SUCCESSES	AMBASSADORS ARTES Integrated Applications Promotion (IAP)		
	Ö Ö			 ESA Business Incubation Centre ESA Broker Joined ESA Broker & ESA BIC 	Slide 16

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Technology Transfer Programme Office



• Origin: ISS Biology Facility



• **Destination:** healthcare application





TENDIGO[™] Strip-based assay automated processor

From manual to automation \rightarrow \rightarrow No matter if 1 strip or 10 ones

• **Tendigo**[™] Automation for small testing volumes

• Features

Improving the diagnosis of infectious diseases, generic testing and transplantation based on technology used in the ESA Biolab on the International Space Station



Disclaimer: This is one among many examples of TT outcomes

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