ESA ARTES IAP Health Projects and Opportunities

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Improving Peruvian Mobile Healthcare Facilities in Rural Areas
Satellite Applications Catapult Workshop
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“To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.”

Article 2 of ESA Convention
Network of Ambassador Platforms and Business Incubation Centres
ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity.

1. Space science
2. Human spaceflight
3. Exploration
4. Earth observation
5. Launchers

- Navigation
- Telecommunications & Integrated Applications
- Technology
- Operations
ARTES Applications Programme Elements providing a steady stream of opportunities

**ARTES 20**
Integrated Applications Promotion (IAP)
(Multiple Integrated Space Assets
SatCom, SatNav, Sat-AIS, SatEO, HSF)

- Aviation & RPAS
- Transport & Logistics
- Tourism
- Safety & Security
- Media & Broadcasting
- Maritime & Offshore
- Infrastructures & Smart Cities
- Health
- Education & Development
- Energy
- Environmental Resource Management
- Finance, Investment & Insurance
- Food & Agriculture
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**Approximately 300 projects**
**ARTES Applications**
**Approximately 315 activities**
**473 entities**
**26 Countries**

**3rd Party Funding:**
EIB, EC, EDA, EMSA, ERA, SERAPHIM
IAP addresses almost every market sector (Number of discrete activities from 2009-2014)
eHSA

EHealth for sub-Saharan Africa

- Sub-Saharan Africa (SSA) comprises 48 countries, numerous challenges faced by the region, poor health generally, due to:
  - high disease burden, pressure on healthcare systems.
  - wide geographic extent of the region
  - low penetration of ICTs
  - low population density
  - inadequate and dwindling health workforce
- eHSA focused on implementation of long-term of sustainable eHealth services in SSA based on a scalable infrastructure.
- 4 horizontal feasibility studies, second phase of fertilisation projects in thematic areas:
  - Governance - governance model for the proposed eHSA services
  - Regulatory - scenarios in SSA, examining aspects such as standards of care, data security and privacy, liability regimes, licensing,
  - Interoperability - examine how satellite infrastructure can complement existing terrestrial infrastructure, with the goal of optimizing system efficiency and minimizing costs
  - Sustainability - aspects which are necessary for the long-term operation of the eHealth services, including liability issues
Disease vector mapping

- Outbreaks of Chikungunya
  - Reunion 2005-2006
  - Ravenna (Italy) 2007
- Global introductions of disease vectors
  - International trade (e.g. eggs in tyres)
  - Tourism
  - Global warming
- Need for surveillance, early warning systems & control
  - Vectors survive only in particular ecosystems
  - Need for spatial prediction maps

Asian Tiger Mosquito  *A. Albopictus*, vector for:
- West-Nile
- Dengue
- Chikungunya
- Yellow fever
- St. Louis Encephalitis

[Video](https://www.youtube.com/watch?v=bVRHuS98Gf0)
Lyme disease (Lyme borreliosis), bacterial infection spread to humans by infected ticks

• LB is a growing health threat, how to reduce risk of infection
• Globally, LB found in ≥ 80 countries, worldwide significance
• Need accurate information on disease epidemiology of the and locations of transmission “hot spots” of transmission

LymeMAP
• LB identification, mapping and risk management system incorporated within a smartphone app and web portal
  • EO satellite data, GPS data
  • Lyme data from Scottish National LB Testing Lab
  • Data from General Practitioners, and from end-users
  • Spatial modelling maps of Lyme risk and vector distributions.

Main service users:
• Health care organisations (Health Protection Scotland and Health Boards)
• Health care professionals (General Practitioners and other clinicians)
• Resident and visiting populations (leisure, outdoor workers)
SmartCare

- Collaborative health care platform
- Virtual space where care professionals and patients collaboratively meet and manage daily activities, planned and unplanned, within a therapeutic process, to optimise Home Care.
- Access to SmartCARE is provided using satellite and terrestrial telecommunication networks by means of fixed or mobile devices.
- Integration of terrestrial communication systems (ADSL, 3G, etc.) with satellite (Ka-band)
- Takes into account the problem of digital divide for a significant part of the European population, and promotes the usage of broadband satellite connections to guarantee the same opportunities of healthcare to the population.

Resolve situations where terrestrial communication isn’t able to offer guarantee the performance required to support the SmartCARE services
B-Life

Transportable bio-laboratory

- Brings a diagnostic capability as close as possible to the crisis area
- “in-the-field analysis” rather than organising a time-consuming and hazardous transportation of samples to a distant conventional reach back laboratory
- Provides essential element of fast emergency response while preserving the safety of deployed staff and of the surrounding populations
  - 1) satellite telecommunications to connect with the distant reach back home base laboratory, stakeholders and end users
  - 2) GNSS (Global Navigation satellite System) data for samples geo-location
  - 3) Earth Observation data for site selection and monitoring
- Successfully deployed in Guinea to fight the 2014-2015 Ebola epidemics
- Also addresses training needs as part of cooperation and development missions, capacity building, etc. to promote autonomy

Integrated Services for Crisis Situation: Fieldable Technologies (ESA-IAP/ARTES 20 - B-LIFE Project)
KosmoMed aims at developing a Satcom based ICT solution providing eHealth application and services supporting private and public institutions. Portfolio of ICT applications to provide physicians and other healthcare professionals with efficient telemedicine solutions, despite the status of deployment of terrestrial IP communications network.

4 Service Categories:
1. Tele-consultation service, 2 time consultation video-con
2. Tele-diagnosis service, physician or technical operator has real-time consultation with share clinical
3. Tele-counseling service, patient has counseling with physician or specialist in real time by video-conference, optionally supported by data sharing
4. Tele-validation service, technical operator has real-time consultation with specialist by video-conference and shares clinical data for validation workflow prior to statistical processing.
Mercury

- Secure communication of patient records and diagnostic mammography scans
- Efficient tasking of mobile units
- Better data security, greater flexibility, better working environment and a better patient experience
- GNSS location and Ka-band broadband satcom system for breast cancer transportable units.
- Connectivity used for RX medical images transfer and back office operations
- Originally developed under ESA ARTES programme
- Currently continuing under the UKSA Space For Smarter Government Programme (SSGP)
iVoice

- 65 people die in open pit mines in Peru on average each year
  - 60% of fatal accidents due to operator fatigue, falling asleep
  - + near misses occur all the time

iVOICE technology
- Based on space communication and GNSS location services
- Non-invasive system aimed at preventing situations where the driver becomes too fatigued to carry out tasks safely.
- Mining industries already relying on satellite infrastructure and services for communication, data transfer and navigation service
  - Need (1): to ensure the health and safety of the truck drivers during long operations and reduce the number, ideally eliminate, accidents.
  - Need (2): a more efficient way to operate through prevention of incidents and accidents that relate to driver’s well-being is an urgent demand.
- World-wide communications mean that the analysis can be performed locally and at remote sites and then displayed to Supervisors at the Mine Operations Centre.
ARTES Applications Portal
https://artes-apps.esa.int
Contact Points & Further Information

- Open Call for proposals, EMITS: [http://emits.esa.int](http://emits.esa.int) (ITT AO6124)

- IAP Website and Ambassador Platforms [http://artes-apps.esa.int](http://artes-apps.esa.int)

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[https://www.youtube.com/watch?v=eBhdpc7ptD4](https://www.youtube.com/watch?v=eBhdpc7ptD4)