

The background of the slide is a high-resolution photograph of the International Space Station (ISS) in orbit above Earth. The station's complex structure, including its central truss, multiple modules, and large solar panel arrays, is clearly visible against the dark blue and white of the planet's atmosphere and clouds. The text is overlaid on this image in a large, bold, white font with a black outline.

Romanian Space Agency

Space Based Technology Applications to eHealth

Dr. Florin Șerban

Space Application for Health context

Space Applications for Health - Premises

- Institutional Basis:
 - Government Strategy;
 - National Programs Funding;
 - ROSA - ESA agreements;
 - Romanian Government - NASA agreement.
- Premises:
 - Development of IT&C infrastructure and services;
 - Awareness of the public and medical community;
 - Political will and support;
 - Public funding support.

The AEROSPATIAL Programme

Under ROmanian Space Agency (ROSA) coordination, is the first public funding mechanism supporting aero-space research and application development

one of the strategic goals:

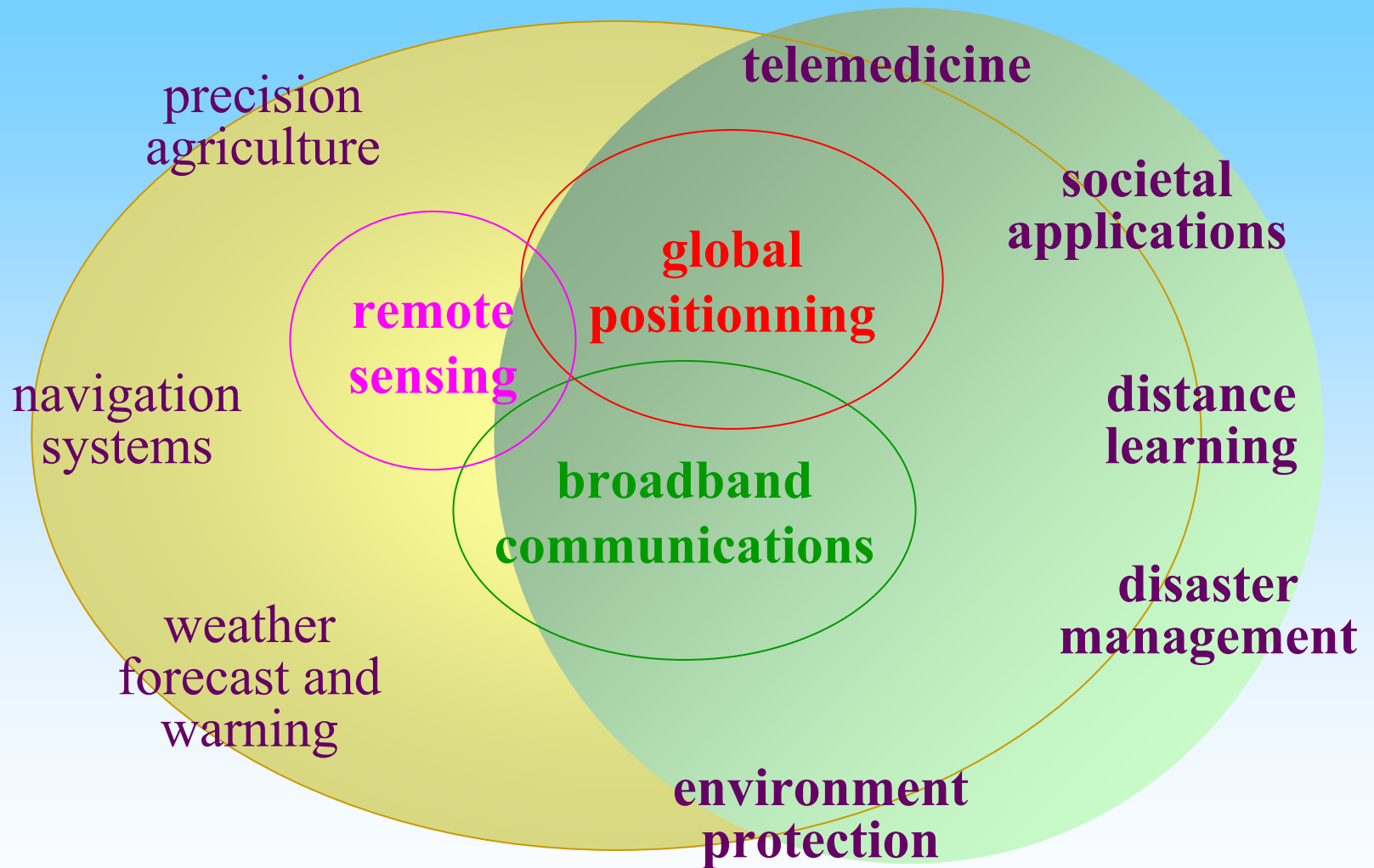
TELEMEDICINE

and

LIFE PROTECTION

Applications

Space Technologies Spin-off



The ROSA Umbrella



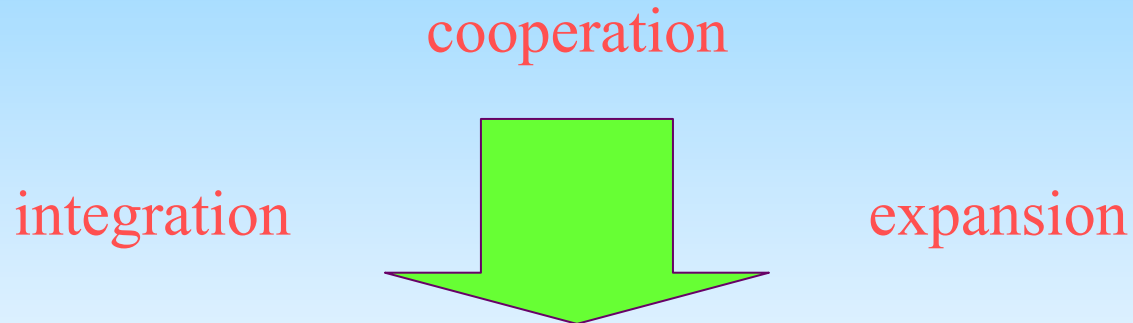
involvement

Professional personalities:

- high, positive commitment
 - mix-qualification skills
 - professional recognition
 - various affiliations
-
- coherent strategy
 - specific targets
 - recommendations
 - harmonization

The Project's Coordination Instrument

Space Technology Applications for Life
Protection pool



The Excellence Centre for Space Applications in
Medicine and Human Biological Welfare

The Excellence Centre Mission

To be a prolific context for
telemedicine and welfare

applications development, beneficial for health care, health preservation, and human life protection within a clean environment

Instruments:

- strong, valuable, national and international partnership;
- use of up-to-date technological support;
- coherent strategic management and funding;
- sustained, continuous, e-education for specialists and public;
- information and dissemination of knowledge for,
- public and institutional awareness increasing.

Attraction Effect Expected

“Gravity” Pattern:

- coherent strategy,
- common projects,
- technological needs,
- societal needs

Critical mass irradiation:

- competence
- solutions
- education
- opportunities



The Excellence Centre Partnership Appeal

- Professional partners (public&private):
 - Medical Institutions;
 - R&D and Technological Organizations;
 - IT&C, Know-How and Applications Suppliers.
- Synergetic partners (public&private):
 - GOV / NGO Institutions and Organizations;
 - Societal beneficiary Institutions and Organizations;
 - Educational Structures.
- Economic orientation:
 - non-profit & commercial.

The Excellence Centre Partnership Status

- Telemedicine partners:
 - The Fundeni Telemedicine Pilot (strategic)
 - The Danube Delta Mobile Telemedicine Pilot (strategic)
 - Clinic Departments in Romania
 - Virginia Commonwealth University - USA
- Human biological welfare partners:
 - The National Institute for Sports Research (strategic)
- Space technology application partners:
 - The Institute for Space Sciences (strategic)
- IT&C applications partners
- Independent professional personalities

The Excellence Centre Concerns

- Strategic efforts in progress:
 - National Telemedicine System expansion and advocacy
 - Mobile Telemedicine for remote areas integration
 - Human health protection and recovery applications
 - National Human Performance Network establishment
 - ARTASS Association establishment
- Calls for national and international cooperation:
 - Medical data processing and mining
 - Medical imaging processing and knowledge extraction
 - GRID Technology support applications
 - Interbalcanic Human Performance Network
 - Danube Basin cooperation for integrated space applications

Some Projects

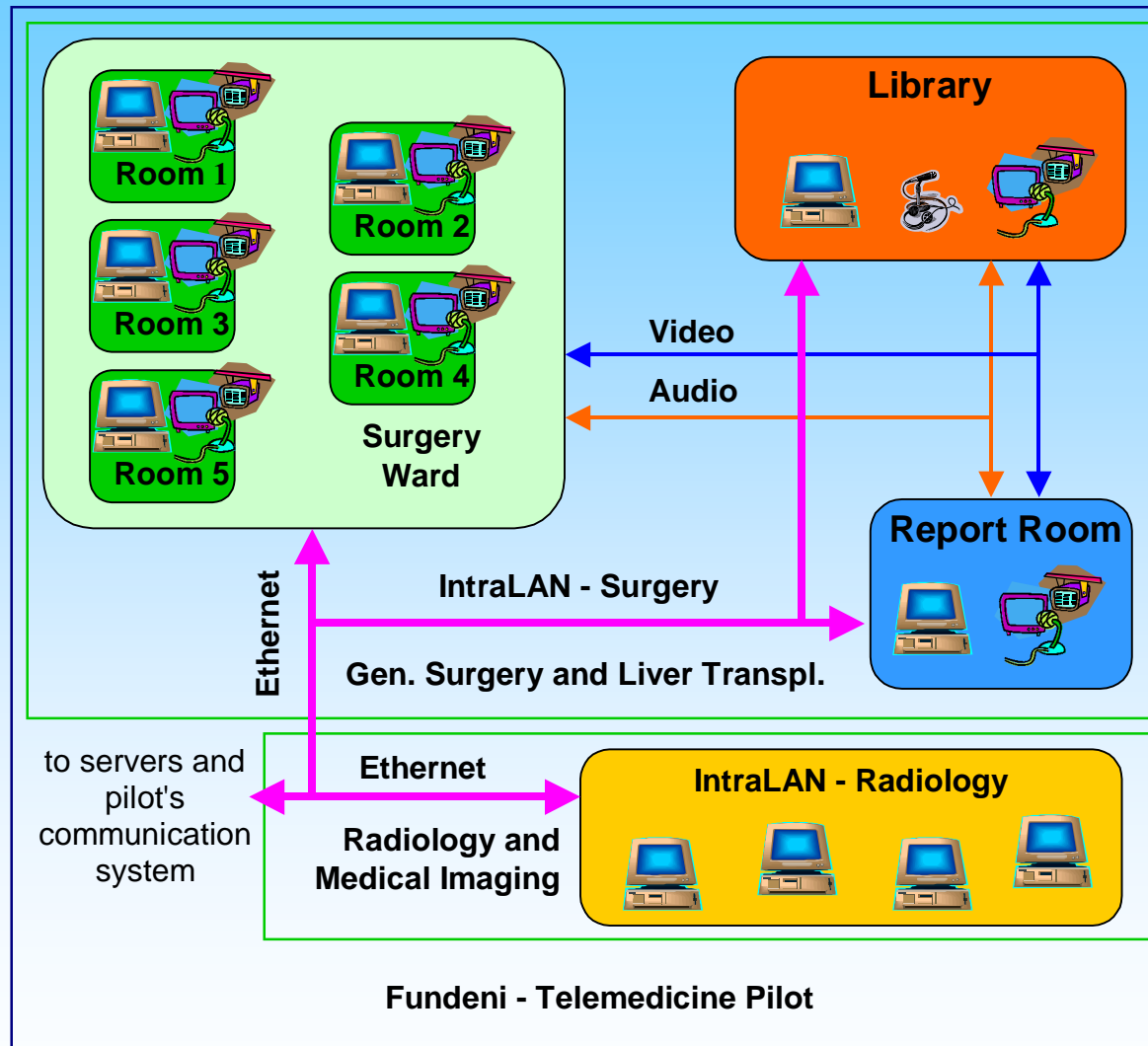
Fundeni Telemedicine Pilot Project

- Funding: The AEROSPATIAL Programme
- Under the coordination of the Romanian Space Agency (ROSA)
- National consortium partnership:
 - Fundeni Clinical Institute (project coordinator)
 - Institute for Space Sciences
 - InterNET srl
- With Partners:
 - IT&C Applications Companies and independent professional personalities

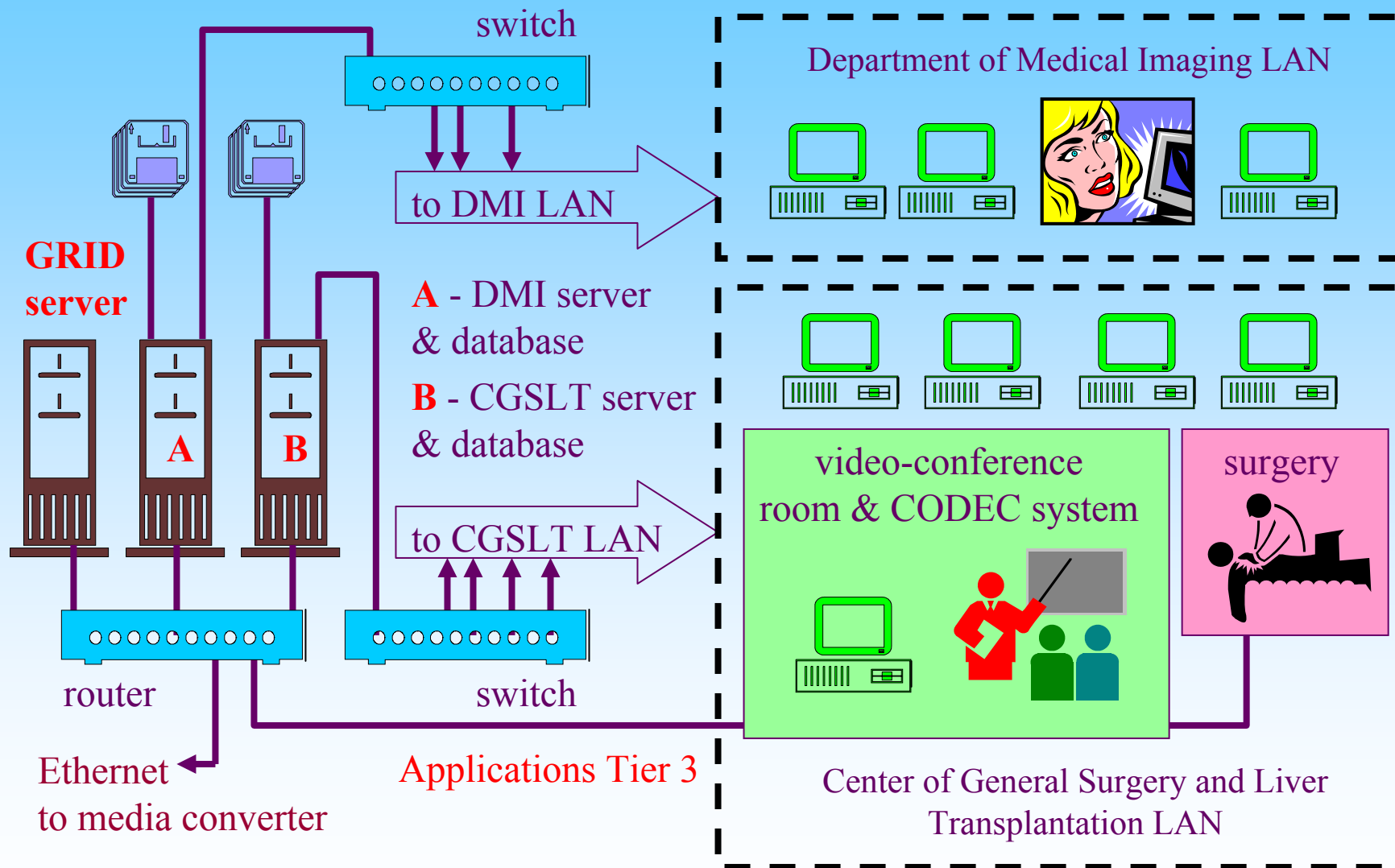
The Telemedicine Need in Romania

- Environment:
 - Remote undeveloped, inaccessible zones;
 - Disaster (flood, seismic activity) hazard;
 - Medical assistance to be improved.
- Needs:
 - Resource sharing and management;
 - Mobile, remote medical assistance;
 - Integration of clinical databases;
 - Training & education of medical personnel;
 - International integration and compatibility.

The Fundeni Pilot - functional environment



The Fundeni Pilot - technological support



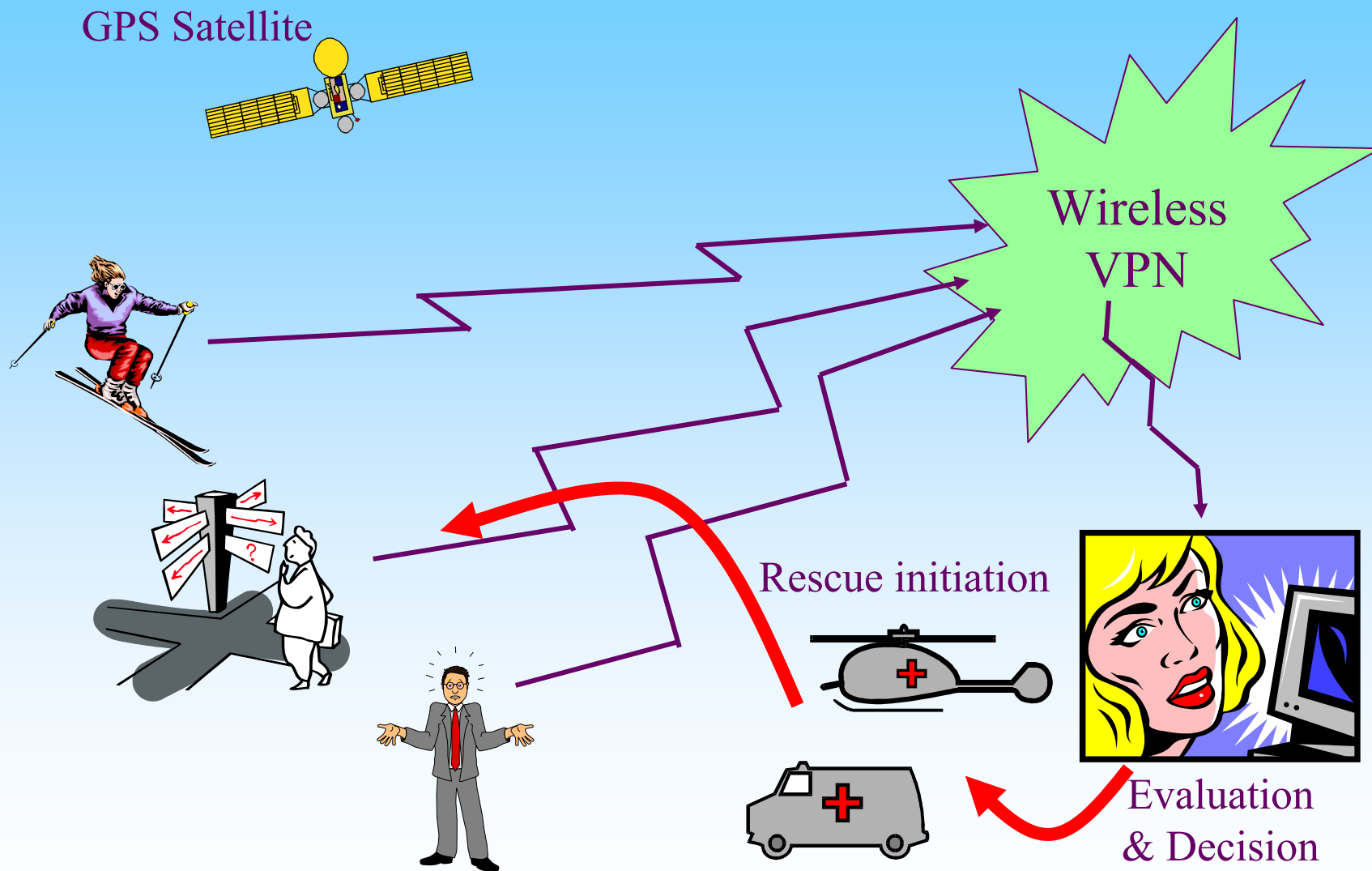
SMOPERR Project

- Funding: The AEROSPATIAL Programme
- Under the coordination of the Romanian Space Agency (ROSA)
- National consortium partnership:
 - National Institute for Sports Research (project coordinator)
 - Institute for Space Sciences
 - Fundeni Clinical Institute
 - Romanian Kayak-Canoe federation
- With Partners:
 - IT&C Applications Companies and independent professional personalities

SMOPERR Goals

- Modeling of a rescue service for persons with high risk for survival (cardiovascular patients, diabetic patients, persons with disabilities, aged people, etc.);
- Testing a pilot of the service in simulated conditions on kayak embarked sportsmen;
- Evaluation of the pilot potential for other social spin-off's as further applications in sports, health care and security.

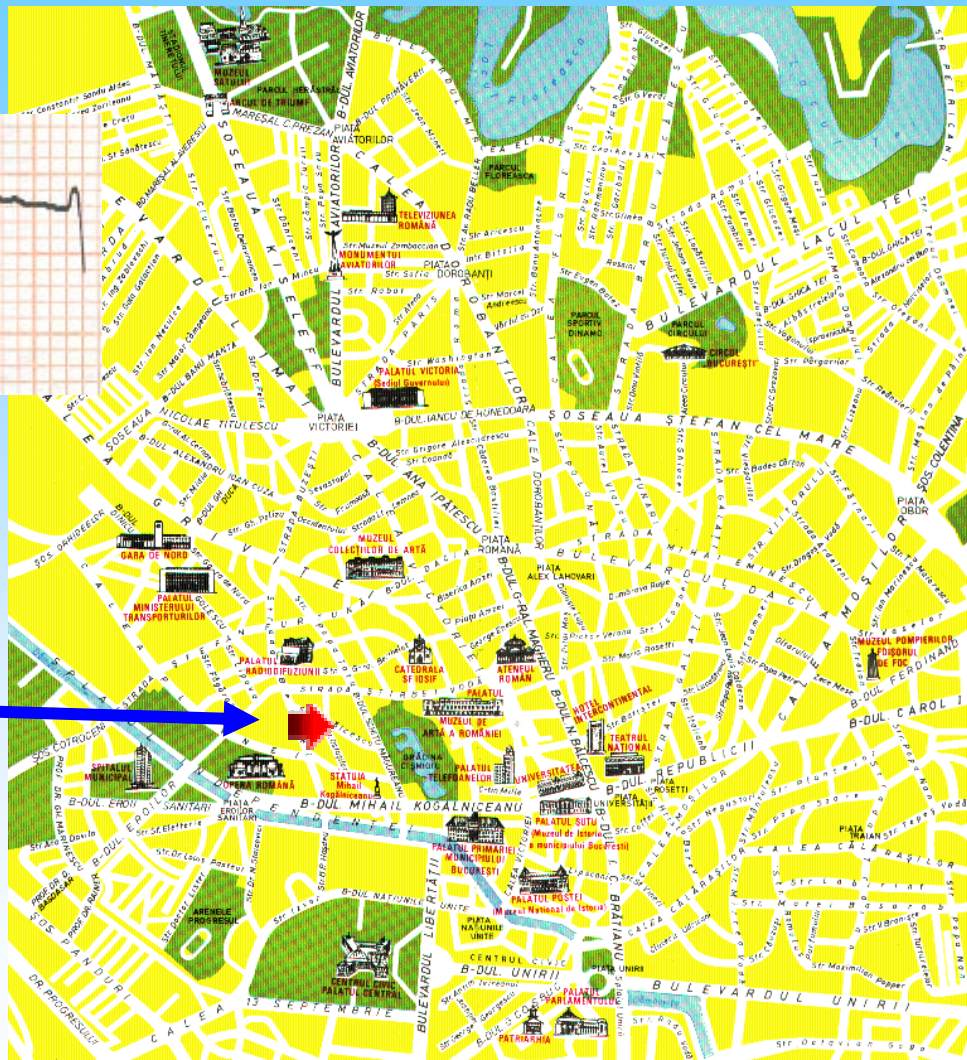
SMOPERR Principle of Operation



SMOPERR Functional Lanscape



- Status: **online**
- Patient Code: **0783**
- Probable alarm: **cardiac arrhythmia**
- Position: **C3;H6**
- Recommended action:
 - **immediate medical assessment;**
 - **rescue initiation.**



Human Performance - related Projects

- Funding: The AEROSPATIAL Programme
- Funding: The INFOSOC Programme
- Projects: HUP-GRID, EXTREM-GRID
- Projects partners:
 - National Institute for Sports Research (project coordinator)
 - ROSA Research (project coordinator)
 - Floreasca Emergency Hospital
 - Onlinesolutions Media srl
 - “Lucian Blaga” University - Sibiu
 - National Institute for Aeronautic and Space Medicine

Human Performance Concept

- The human being performance, as a whole, implies rising to a higher level the ancient adagio “*Mens sana in corpore sano*”...
... and means bio-, neuro-, and mental- control.
- What do have in common space, medical, sports and technological research with HuP? ...
... the mix-disciplinary challenge to extract knowledge from a huge amount of specialized data, in order to assess, enhance and stimulate HuP.

Human Performance ... an example

<< Can you imagine spending eight weeks in bed? ... ESA is looking for to take part in the Women International Space Simulation for Exploration (WISE) study. The study is a joint venture between ESA, CNES, CSA and NASA.

For the scientists involved in the study it is an opportunity to find out more about the effects of long-term space travel on the female body. Lying in this position for an extended period triggers physiological changes, such as bone and muscle loss as well as changes in blood pressure and heart rate...

The study will assess the roles of nutrition and combined physical exercise in countering the physiological changes. ... findings could also contribute to improved recovery methods for patients confined to bed

... benefits for health include new knowledge on medical conditions linked to a sedentary lifestyle ... common in industrialised countries and the findings could provide significant arguments for leading a more healthy life.

For more information about the WISE study ... see: <http://www.medes.fr/ltbrw> >>

quotations from a recent online ESA Information Bulletin

GRID - related Health Applications Projects

- Funding: The AEROSPATIAL Programme
- Funding: The INFOSOC Programme
- Projects: InGRID, HUP-GRID, EXTREM-GRID
- Projects partners:
 - Institute for Space Sciences (project coordinator)
 - National Institute for Sports Research (project coordinator)
 - ROSA Research (project coordinator)
 - Fundeni Clinical Institute
 - Floreasca Emergency Hospital
 - Onlinesolutions Media srl
 - “Lucian Blaga” University - Sibiu
 - National Institute for Aeronautic and Space Medicine

The GRID Concept

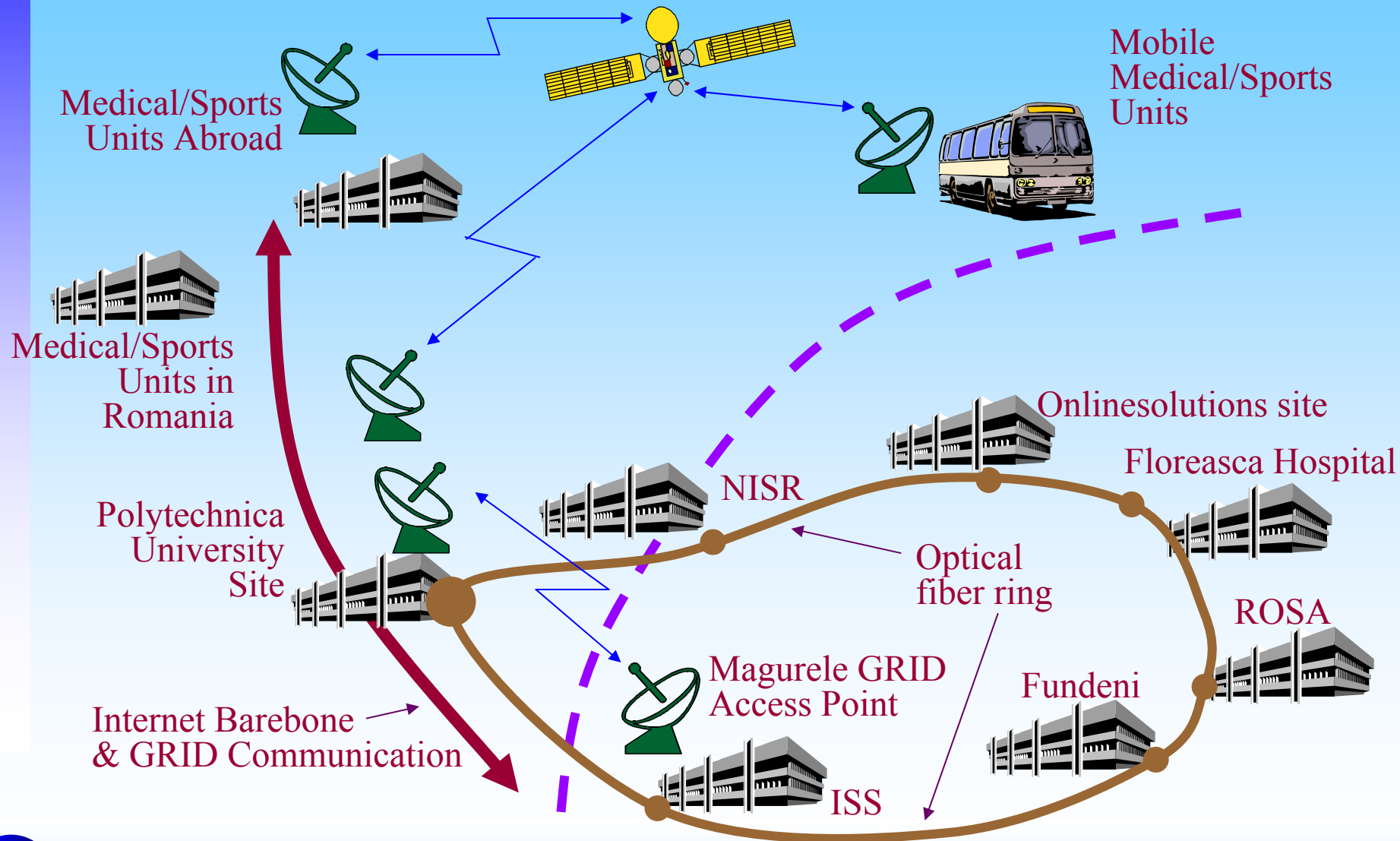
- GRID enable the sharing, selection, and aggregation of a wide variety of geographically distributed computational resources (such as supercomputers, compute clusters, storage systems, data sources, instruments, people) and presents them as a single, unified resource for solving large-scale compute and data intensive computing applications

GRID technology enables the access to:
a virtual supercomputer distributed all over the town,
country, world, so performant nobody can buy alone !!

Medical and Human Performance GRID

- The technology GRID enable the establishment of “GRID communities” connected together into an application pool.
- Conditions:
 - have computational and/or storage resources to share;
 - have primary data source (images, bio-motric, etc.) to share;
 - have good data communication capabilities;
 - use appropriate software and know-how.
- The goal:
Built “different-GRID” specific communities in national and international partnership

GRID Application Community Connectivity



Mobile Telemedicine in Romania



Mobile Telemedicine Related Projects

Public/Private Partnerships and Consortia developing Telemedicine and Life Protection projects

- The AEROSPACE Programme:
 - DELTA - mobile telemedicine services in remote, infrastructureless areas;
 - SMOPERR - mobile monitoring of humans in conditions of high vital risk.
- The National Trauma Network:
 - Mobile, Critical & Trauma Medicine;
 - Rescue and Pre-clinic Services.

Mobile Telemedicine Resources

- Practice in “classical telemedicine” such as tele-diagnostics, tele-radiology, tele-consulting and continuous distance medical education;
- Rescue, Critical & Trauma Services;
- Integrated Medical Procedures & Protocols;
- IT&C infrastructure and know-how;
- Wireless Data Communication resources including Mobile Telephony and Satellite Data Communications;
- WEB based technology and applications.

Mobile Telemedicine Specific Goals

- Medical assistance in remote areas and/or in critical situations (disasters, terrorism, etc.)
- Fast response for Critical and Trauma Medicine;
- Integration of in-situ medical assistance with clinical response at the hospitals;
- Interoperability of medical procedures at all levels of Critical and Trauma Medicine;
- On-line connection with major Medical Units as source for tele-consulting and tele-mentoring;

Mobile Telemedicine Integrated Goals

- Integration in the National Telemedicine System;
- Integration in the National Health-Care System;
- Telemedicine Productivity;
- Regional & International Integration;
- Strategic connections with other Applications for Human Life Protection: GMES, Border Security, Anti-Terrorism, Disaster Management, etc.

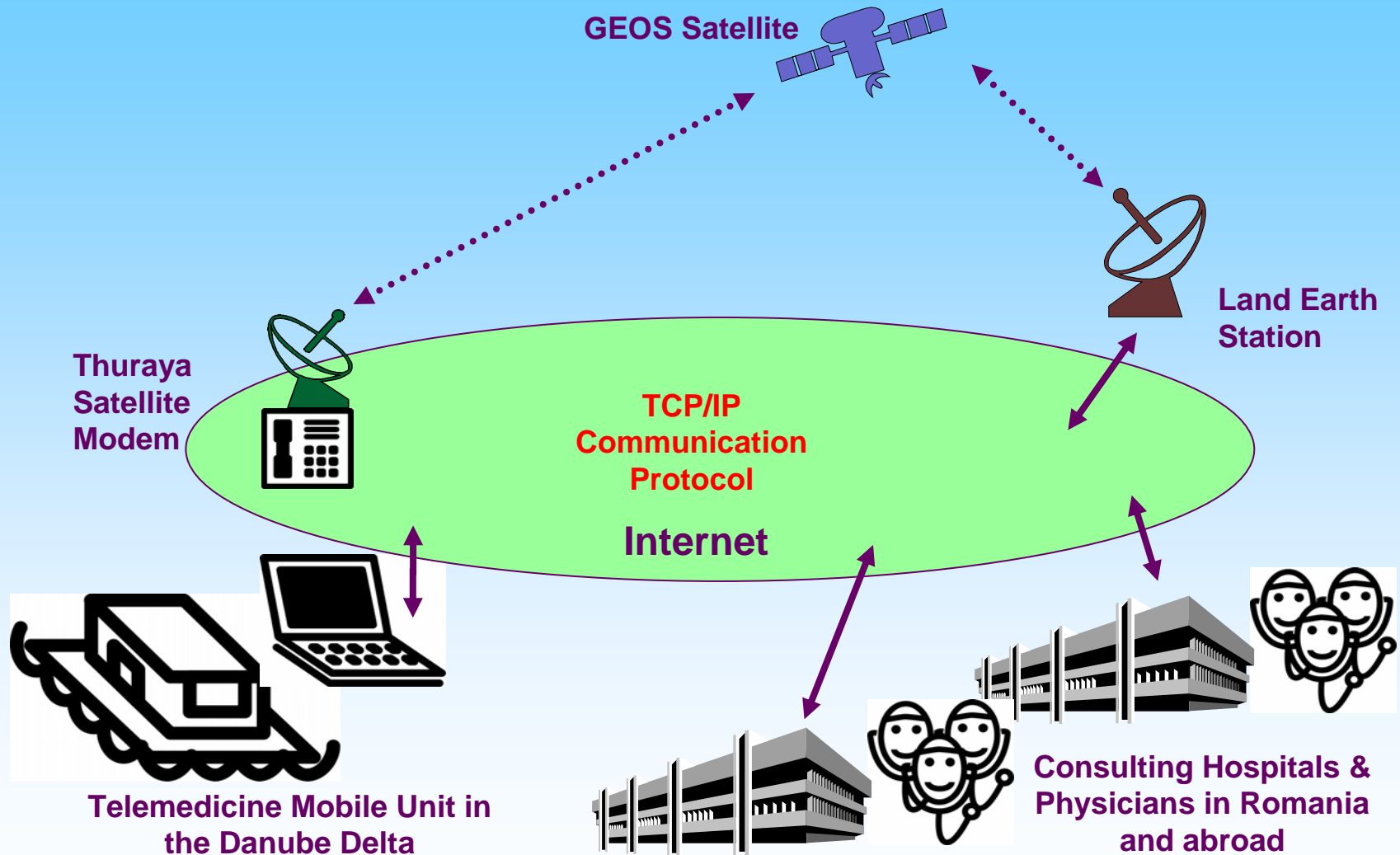


DELTA Project a case study

DELTA Project Ground

- Funding: The AEROSPATIAL Programme
- Under the coordination of the Romanian Space Agency (ROSA)
- National consortium partnership:
 - Constanța County Emergency Hospital (project coordinator)
 - Fundeni Clinical Institute - Bucharest
 - Tulcea County Hospital
- With Partners:
 - Virginia Commonwealth University, Communication Companies, IT&C Applications Companies and independent professional personalities

Mobile Telemedicine - Principle of Operation



Simple, Direct Available, Equipment



Multimedia, notebook-based console



... with suitable medicalization equipment



... communicating via satellite modem

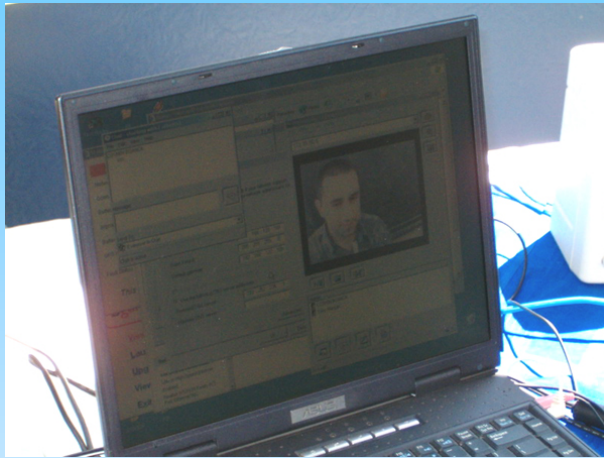


... embarked on small, intervention vehicle

Addressing Remote, Small, Communities



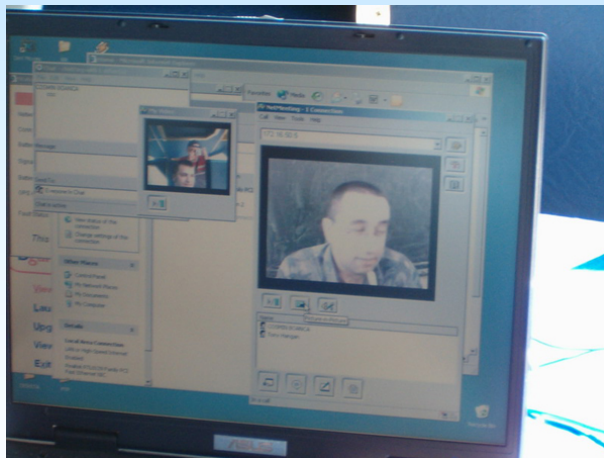
Tele-consulting, Tele-mentoring, Tele-learning



NetMeeting tele-consulting



... tele-diagnosis

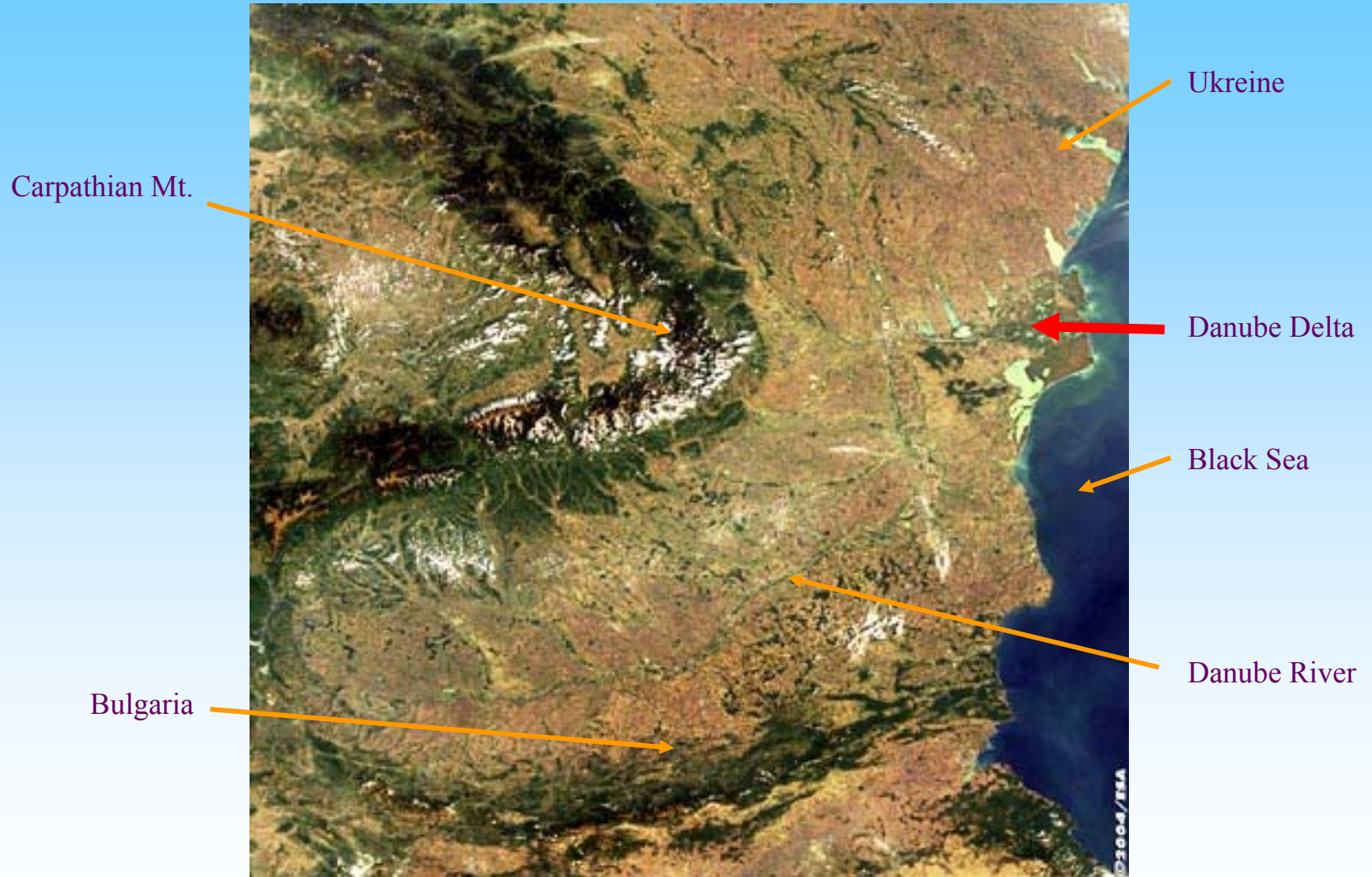


... tele-mentoring and learning

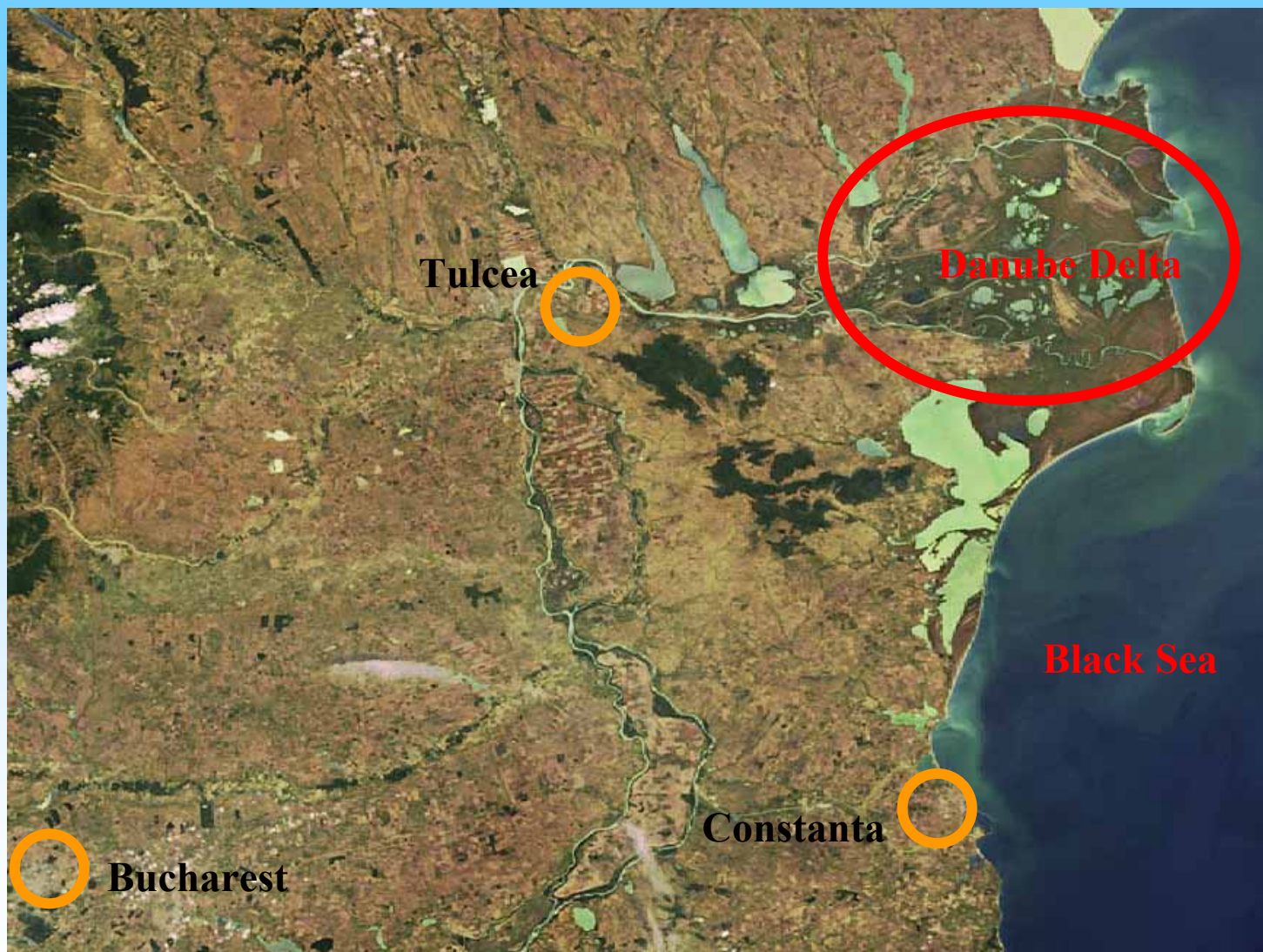


... medical nursing-level, on-site operation

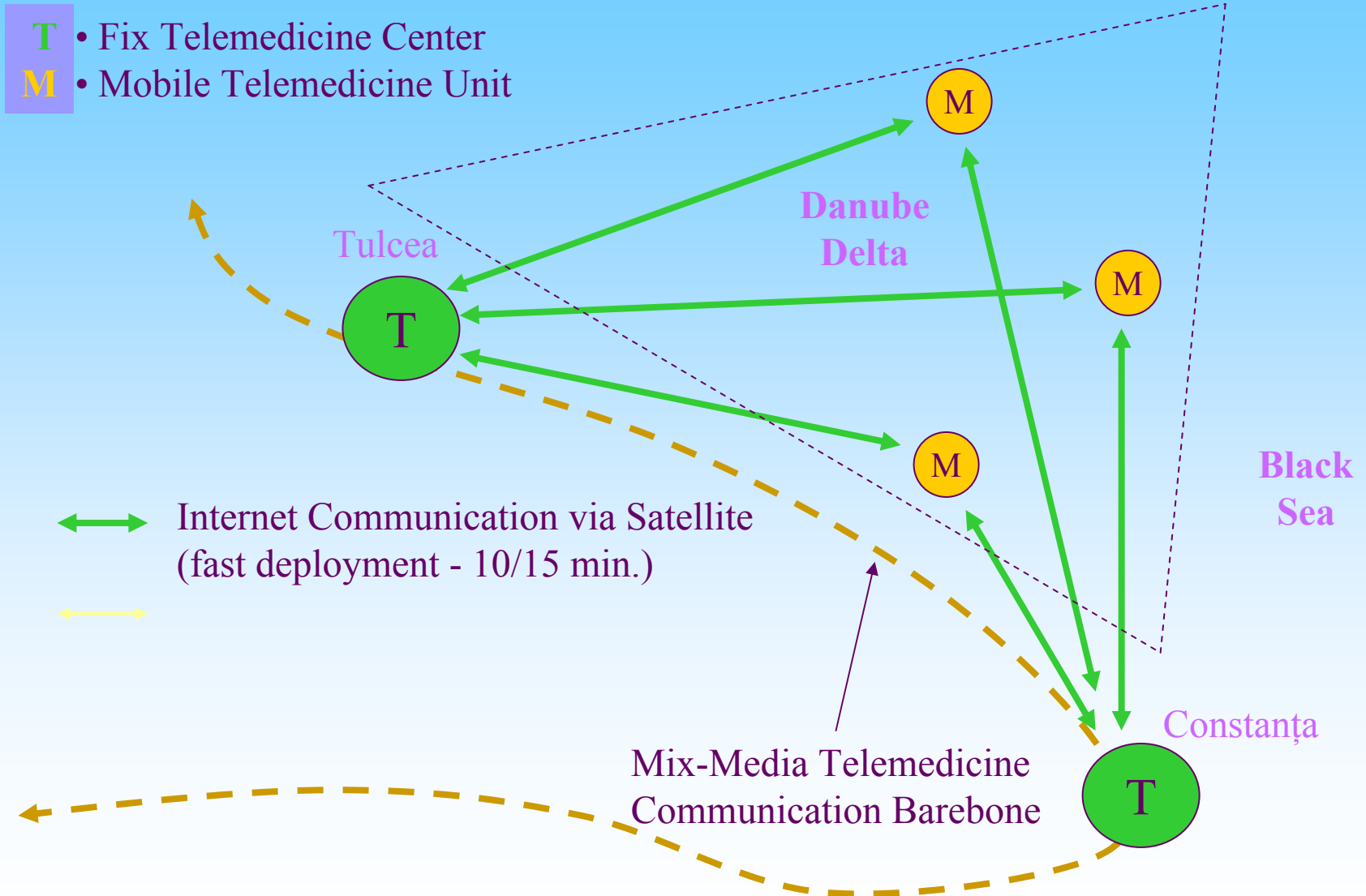
DELTA – Geography



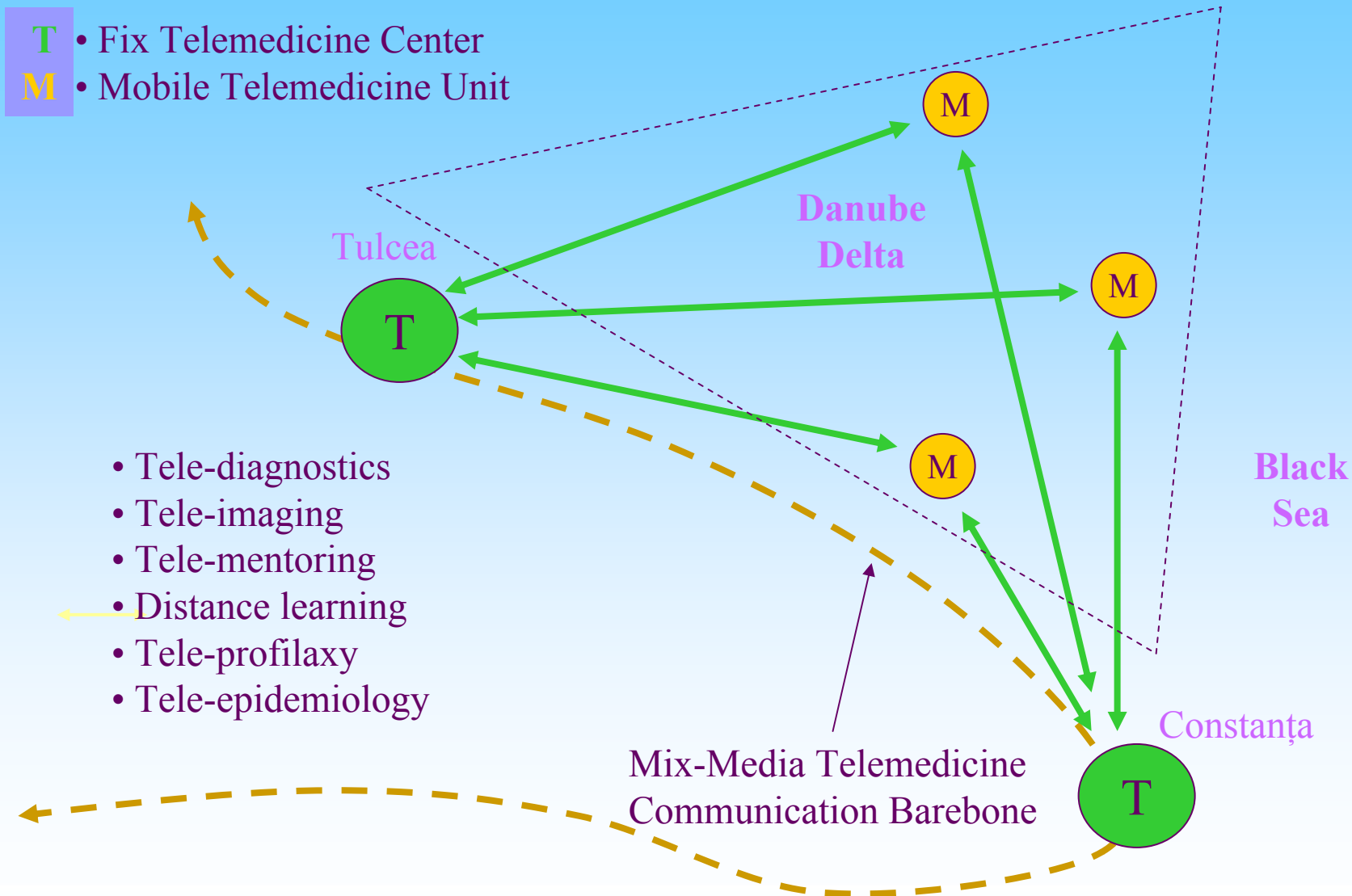
DELTA – Geography



DELTA – Data Communication Support



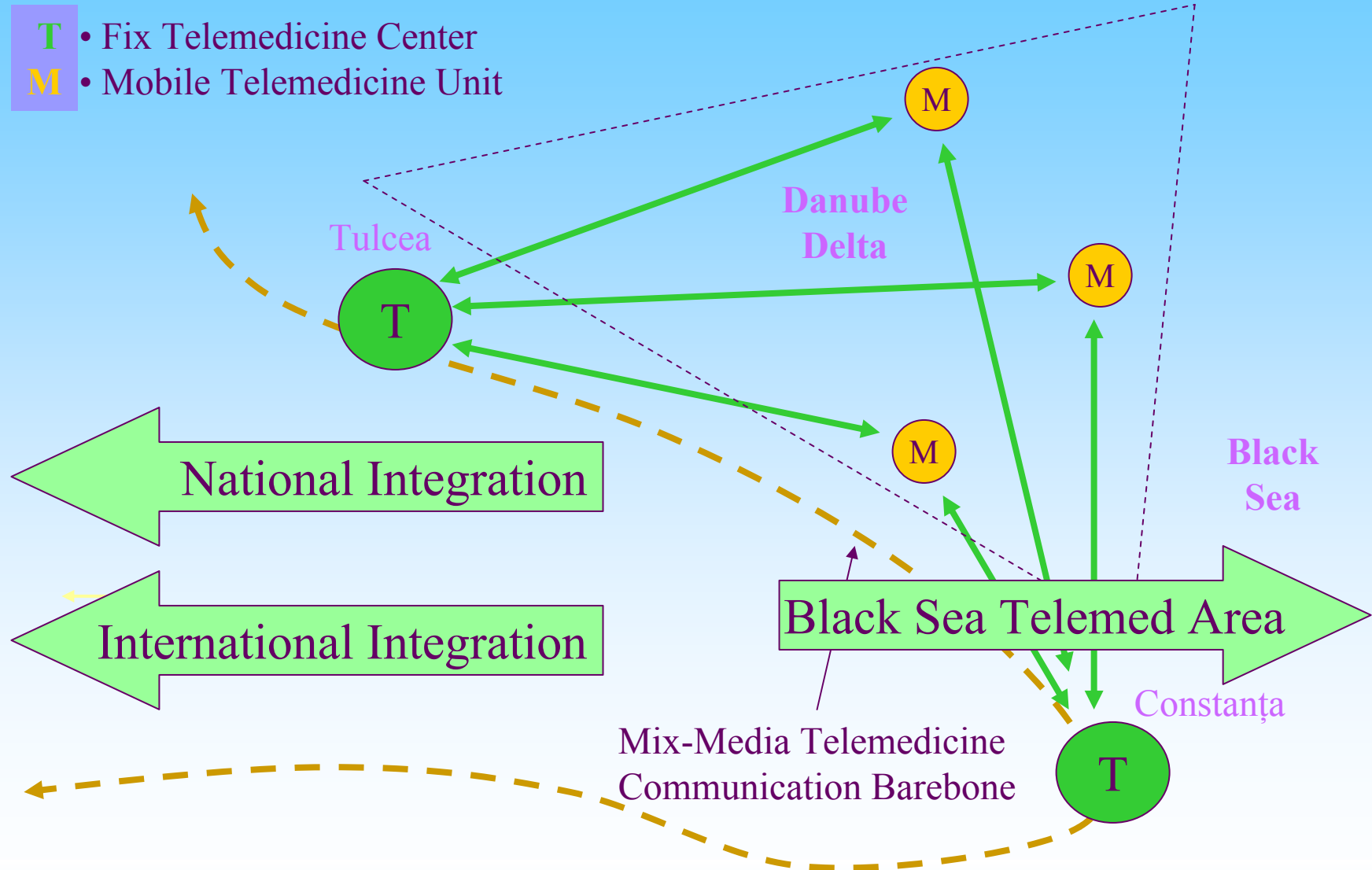
DELTA – Telemedicine Functions



agenția spațială română - romanian space agency



DELTA – International Integration



DELTA – Project Schedule



DELTA Avantpremiere Demo

[please visit the web reference](http://www.e-medicina.ro/fundeni_telemed/english/events/events.html#delta_demo)

http://www.e-medicina.ro/fundeni_telemed/english/events/events.html#delta_demo

Thanks for your kind attention !

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