INSTITUTE OF SPACE SCIENCE

Sorin ZGURA

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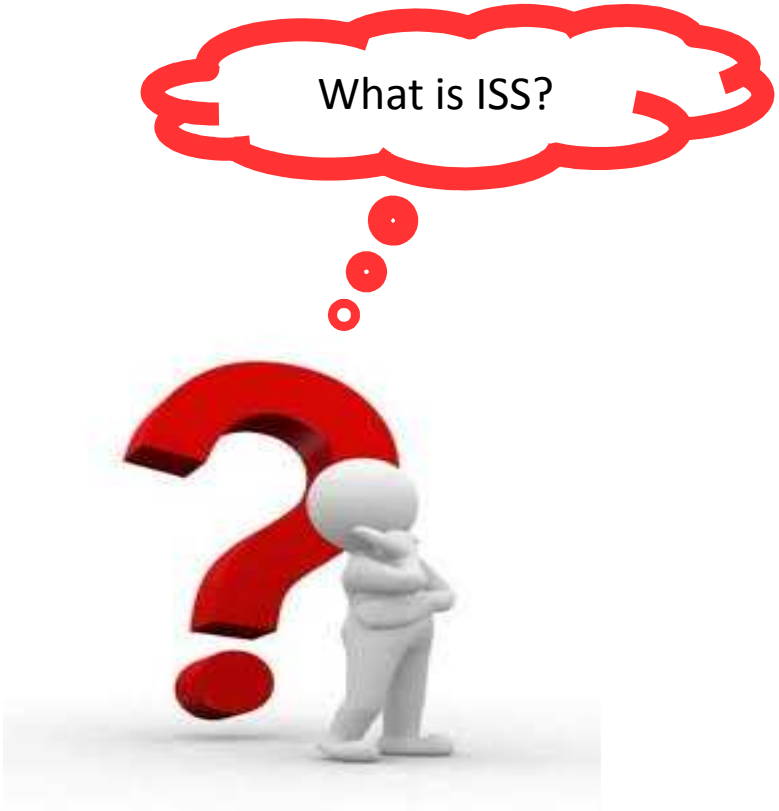
http://www.spacescience.ro

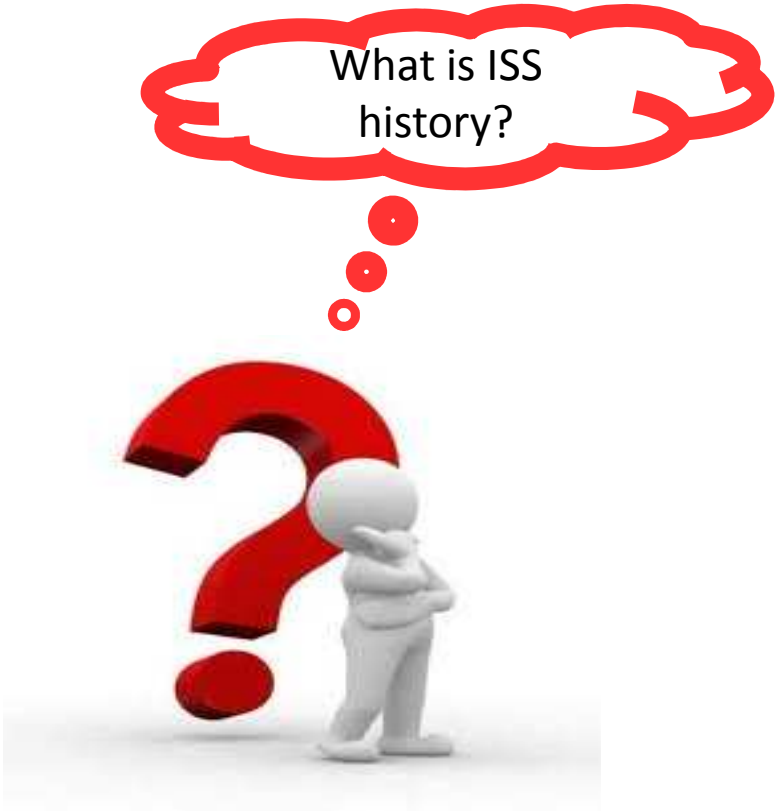

What is ISS?

INSTITUTE OF SPACE SCIENCE

legal subsidiary of the

National Institute for Laser, Plasma and Radiation Physics (INFLPR)

(http://www.spacescience.ro)


What is ISS history?

Short history

1. **1956 ÷ 1977**

   Cosmic Ray Laboratory

   Institute for Atomic Physics, Bucharest

2. **1977 ÷ 1990**

   Center of Astronomy and Space Sciences

   Institute for Atomic Physics, Bucharest

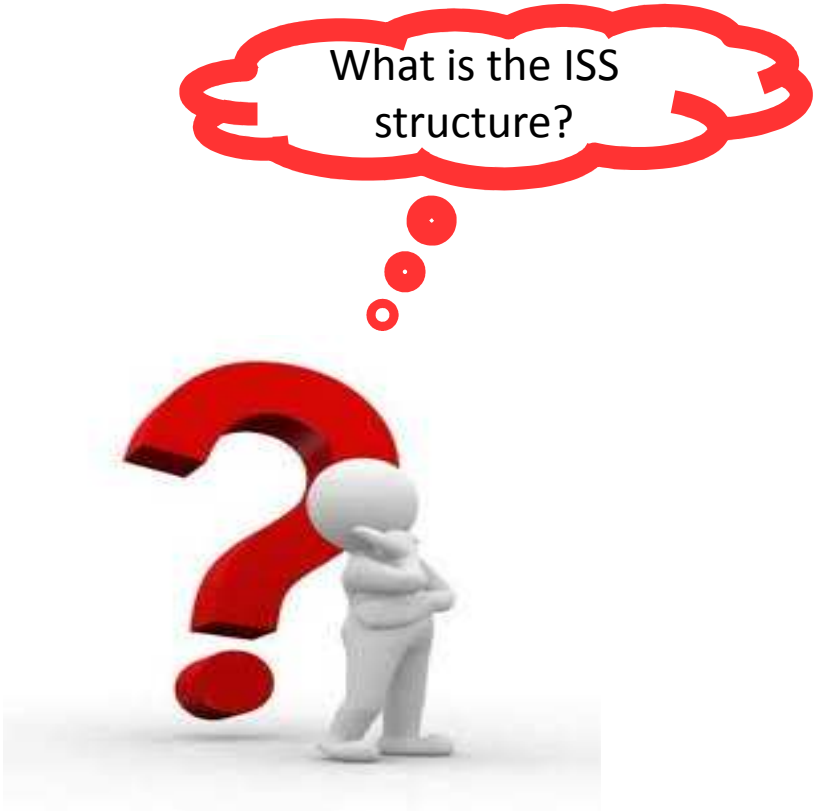
3. **1990 ÷ 1996** → ***strategy: involvement in big international projects***

   Institute for Gravitation and Space Science*, Institute for Atomic Physics, Bucharest*

4. **1996 ÷ present**

   Institute of Space Science subsidiary of the

   National Institute for Laser, Plasma and Radiation Physics, Bucharest


What is the ISS structure?

ISS Structure

Laboratories

1. High Energy Astrophysics and Advanced Technologies
2. Cosmology and Astroparticle Physics
3. Theoretical Physics
4. Space Plasma and Magnetometry Group
5. Applications of space and communicational technology for society
6. Gravity, microgravity and nanosatellites

Lab: Theoretical Physics
Head of the Lab : Cecil Pompiliu GRUNFELD

Research topics:

- Atomic and molecular processes
- Kinetic theory of complex systems, exactly solvable models
- Space-time structures and symmetries in General Relativity

Lab: Cosmology and Astroparticle Physics
Head of Lab: Lucia Aurelia POPA

Research topics:

- Early Universe; Cosmic Microwave Background; Dark Matter ;Dark Energy; Modified Gravity; ESA Space Missions: Planck, EUCLID, CoRE
- Neutrino astronomy: ANTARES and KM3NeT; Gamma-Ray Astronomy;
- Development of neutrino telescopes.
- Galactic Physics; Black holes; Neutrino astrophysics.
- Cosmic Rays: exotic particles

Lab: High Energy Astrophysics and Advanced Technologies
Head of the Lab: Titi PREDA

Research topics:

- Large Hadronic Collider, High Energy Physics, Quantum Chromodynamics, Quark Gluon Plasma, Heavy-ions, Relativistic heavy-ion collisions, Quark deconfinement, quark-gluon plasma production, phase transition
- Nuclear Experiment, few body system, relativistic radioactive beam Astrophysics - High Energy Astrophysical Phenomena, cosmic ray observatory
- GRID Computing, HPC, GPU, clustering, embedded systems

Lab: Space Plasma and Magnetometry Group;

Head of the Lab: Octav MARGHITU

Research topics:

- Solar-terrestrial interactions;
- Fundamental processes in collisionless plasma disturbances in geospace and connections to the Earth;
- Hardware development and software tools;

Lab: Applications of space and communicational technology for society
Head of the Lab: Vlad VALEANU

Research topics:

- Spatial & Communicational Technologies Applications in the Society Benefit
- Ground mobile telemedicine applications with satellite communication covering the diagnostic and curative dimension and the support in crisis situations, disasters, etc.
- Applications aiming counter-measures at the adverse effect of space environment due to micro-gravitation
- Data mining applications for satellite image time series (SITS) analysis aiming detection and characterization of evolutions

Lab: Gravity, microgravity and nanosatellites

Head of the Lab: Marius-Ioan PISO

Research subjects:

- Gravity & orbits
- Nano-satellites
- Space Weather
- Earth observation


What are the ISS
Strategic Goals

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O1. Involvement in ground-based experiments of national and international interest.

- D1.1 Neutrino astrophysics, multi-messenger astronomy with neutrinos, gamma and ultrahigh energy cosmic rays (participation at ANTARES, KM3NeT, DWARF, Pierre Auger Observatory).
- D1.2 Search of exotic particles and phenomena in cosmic rays and colliders/accelerators beams (participation at ANTARES, KM3NeT, LHC-ALICE-CERN, MoEDAL – CERN, NUSTAR-FAIR-GSI, ILC, NICA-JINR DUBNA, NUCLOTRON-JINR DUBNA).
- D1.3 Innovative particle detection techniques with applications to large scale ground-based experiments (e.g. FCAL).
- D1.4 Search for astronomical and astrophysical signatures of Weak Equivalence Principle (WEP) violations.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O2. Involvement in satellite space missions of international interest.

- D2.1 Investigation of solar system plasmas by satellite observations (e.g. by participation to the ESA missions Cluster, Venus Express, Swarm, Solar Orbiter and to the NASA missions THEMIS and MMS).
- D2.2 Participation to ESA scientific missions for the search of dark matter, dark energy and modified gravity (PLANCK, EUCLID, CoRE)

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O3. Involvement in the International Space Station

- exploitation as a space platform for scientific and technological experiments.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O4. Development of space science technology facilities.

- D4.1 Development of satellite instrumentation.
- D4.2 Development and integration of microsatellites for space applications (GOLIAT).
- D4.3 Development of a competitive integrated satellite ground testing facility.
- D4.4 Development of a competitive satellite missions and communication centre.
- D4.5 Development of a comprehensive testing and simulation facility for human space flight countermeasures.

O5. Development and improvement of a strong computational and theoretical infrastructure to support the strategic plan objectives:

- D5.1 Development and improvement of large scale High Performance Computing (HPC) facilities for high energy physics, space science, astrophysics, and applications (e.g. GRID sites for the ALICE-CERN Collaboration, GPU computing, ESA-PLANCK, FAIR-NUFAR-GSI).
- D5.2 Stronger involvement in the study and numerical modelling of complex processes and structures in theoretical astrophysics, gravitation, cosmology, and physics of the violent Universe.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O6. Integration of the ISS activities in national and international space applications of social and strategic interest, with the possibility of technological transfer to public, private and strategic partners:

- D6.1 Disaster management.
- D6.2 Mobile, in-field, satellite communication telemedicine for critical situations response.
- D6.3 Weather surveillance.
- D6.4 Remote sensing.
- D6.5 Countermeasures to human space flight in adverse conditions

International cooperation

ESA projects

1. CLUSTER – ESA mission
2. „Kinetic and Experimental Investigation of Earth's and Venus plasma layers (KEEV)" – ESA Project
3. Energy conversion and transfer in the solar wind - magnetosphere - ionosphere system (ECSTRA) - ESA/PECS project
4. Planck – ESA mission
5. "Coloured Fungi in Space – CFS" – ESA/SURE Project
6. "Romanian GRID middleware repository for Space Science Applications" - ESA/PECS project
7. "Portable Telemedicine Workstation Definition and Specification– PTW" – ESA/PECS Project
8. "EUCLID" – ESA mission
9. „Cosmic Origins Explorer – COrE" – A proposal in response to the ESA Cosmic Vision 2025 (the Institute for Space Sciences is co-author).

Projects at the big European facilities

1. **ALICE – CERN, Geneva**
2. **R3B – FAIR-GSI-Darmstadt, Germany**
3. **“BEQUEREL” – IUCN-Dubna, Russian Federation**
4. **“MoEDAL” – CERN, Geneve**
5. **MultiPurpose Detector at Nuclotron based Ion Collider fAcility – NICA/MPD – IUCN Dubna, Russian Federation**
6. **FCAL @ILC (Forward Calorimeter - International Linear Collider)**

European Projects

1. **ANTARES – International Project**
2. **Km3Net – FP 7**
3. **European cooperation in the field of scientific and technical research - ESSEM – "COST Action ES0803 - „Developing Space Weather products and services in Europe", 2008-2012**
4. **„Balkans, Black Sea and Caspian Sea Regional Network on Space Weather Studies"**
5. **„Simulations for Nuclear Reactions and Structure in Europe (SiNuRSE)" - FP7**
6. **FCAL – R&D International Collaboration for future detectors for e+ e- linear colliders**
7. **ADAMAS (WP16 of HadronPhysics 3), FP7**
8. **"Plasma Processes in the Solar Wind-Magnetosphere-Ionosphere System", cooperation with "Jacobs University Bremen - School of Engineering and Science", Bremen, Germania.**
9. **Plasma coupling in the auroral magnetosphere - ionosphere system (POLARIS) - cooperation with „the International Space Science Institute", Bern**

On-ground experiments

1. **Heavy ion experiments in nuclear emulsions**

   BECQUEREL – ***"Berilium Clustrering Quest in Relativistic Multifragmentation"*, JINR - Dubna, Russia**

2. **ALICE – "*A Large Ion Collider Experiment*" –**

   LHC - Large Hadron Collider, CERN, Geneva

3. ***FAIR* - GSI, Darmstadt:**

   a) - NUSTAR - R^3B – "*Reactions with Relativistic Radioactive Beams*"

4. **SLIM** - "*Search for LIght Monopoles*", *Chacaltaya, Bolivia*

5. **ANTARES** – *"Astronomy with a Neutrino Telescope and Abyss environmental RESearch", Mediterranean See*

6. **Km3Net** – *ESFRI*

7. **MoEDAL – CERN**

8. **Pierre Auger Observatory**

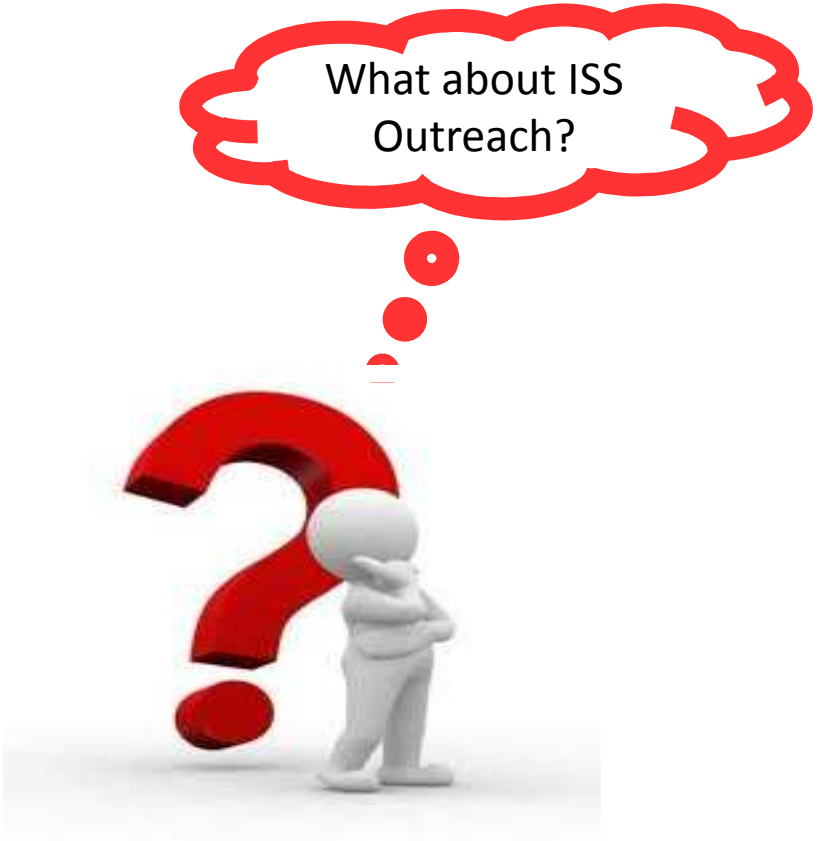
9. **International Linear Collider -FCAL**

Cosmic Vision

2015 - 2025

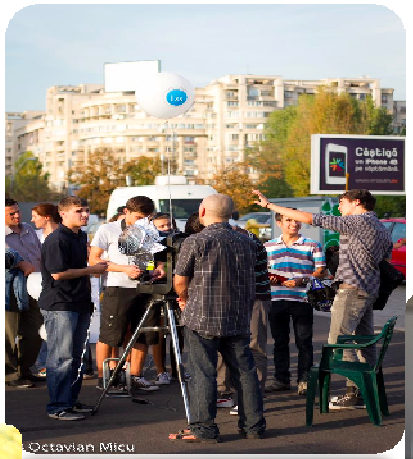
ISS Collaborations

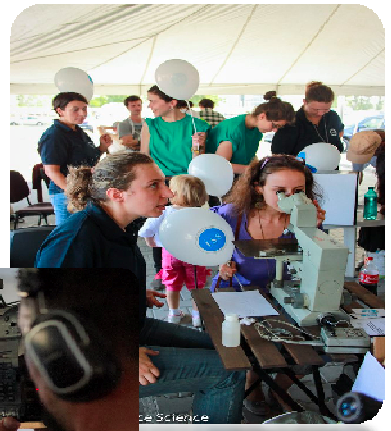
- **EUCLID Mission (SPACE + DUNE)**
- **Cross-Scale Mission: Multi-scale Coupling in Space Plasmas**
    1. **Cross-Scale Magnetometer**
    2. **Studies for Cross-Scale Ion Instruments**
    3. **Studies for Cross-Scale Electron Instruments**

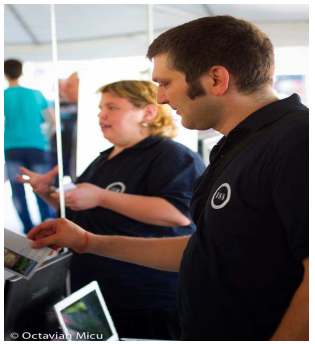

What about ISS Outreach?

HOW WE ACHIVE PERFORMANCE

Public Outreach



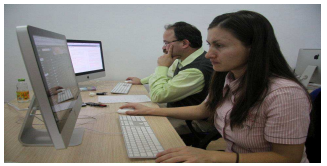




HOW WE ACHIVE PERFORMANCE

Public Outreach

Promotion of the ISS activities on TV Antena1 News



Production by ISS team:

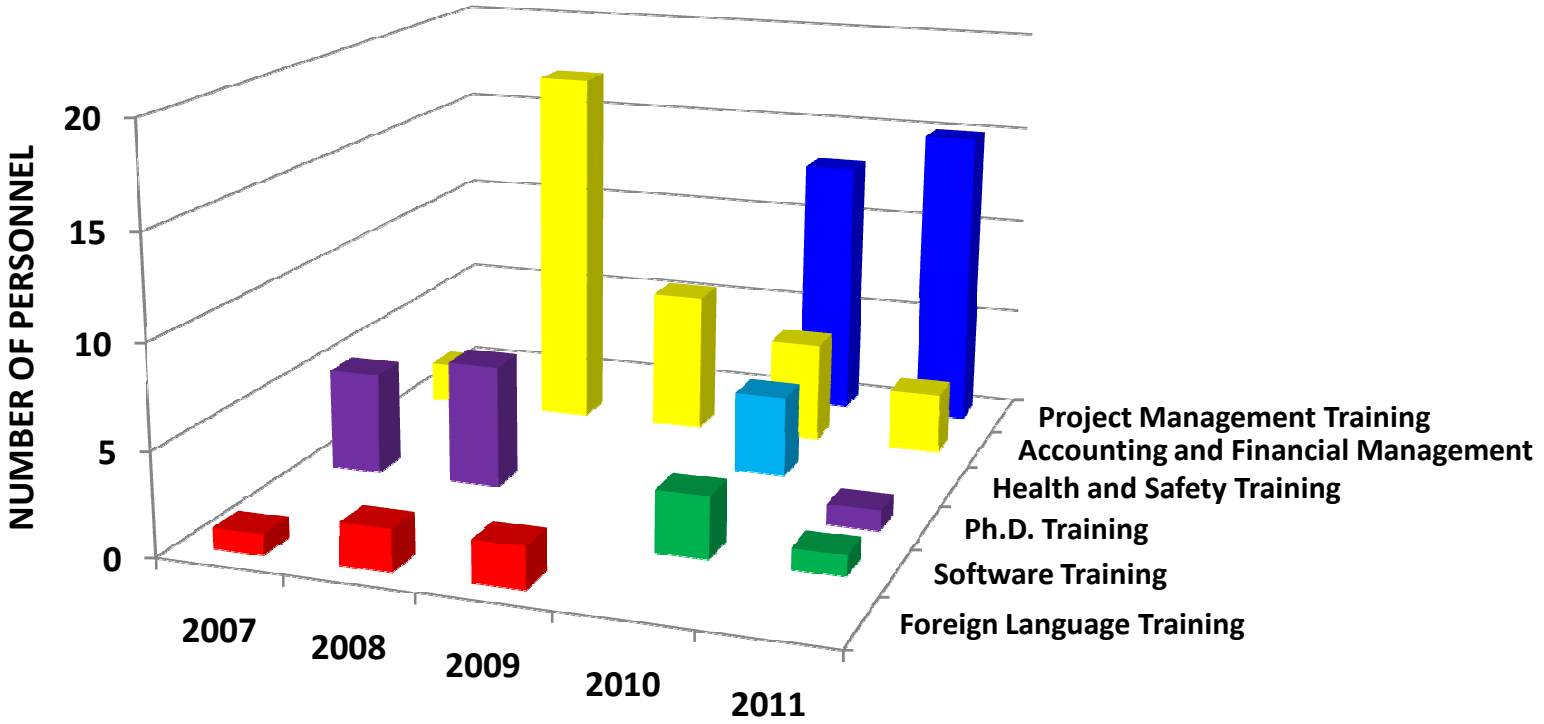
-Gina ISAR (reporter TV) and Ovidiu BANARU (cameraman)


What about ISS
HR Management?

ISS HR Management

- **Recruitment** –has a critical impact on the performance of ISS (in the frame of international collaborations)
  - Positive influx of foreign trained scientists
  - Source of Recruitment: Internal or External
  - Recruitment Strategies (universities, etc)
- **Selection**
  - Effective Employee Selection
- **Placement**
  - Assign a specific job/task to each of the selected candidates
- **Training and Developing HR**
- **Evaluation**
  - For scientists (annual evaluation forms)
  - Administrative staff (external audit)

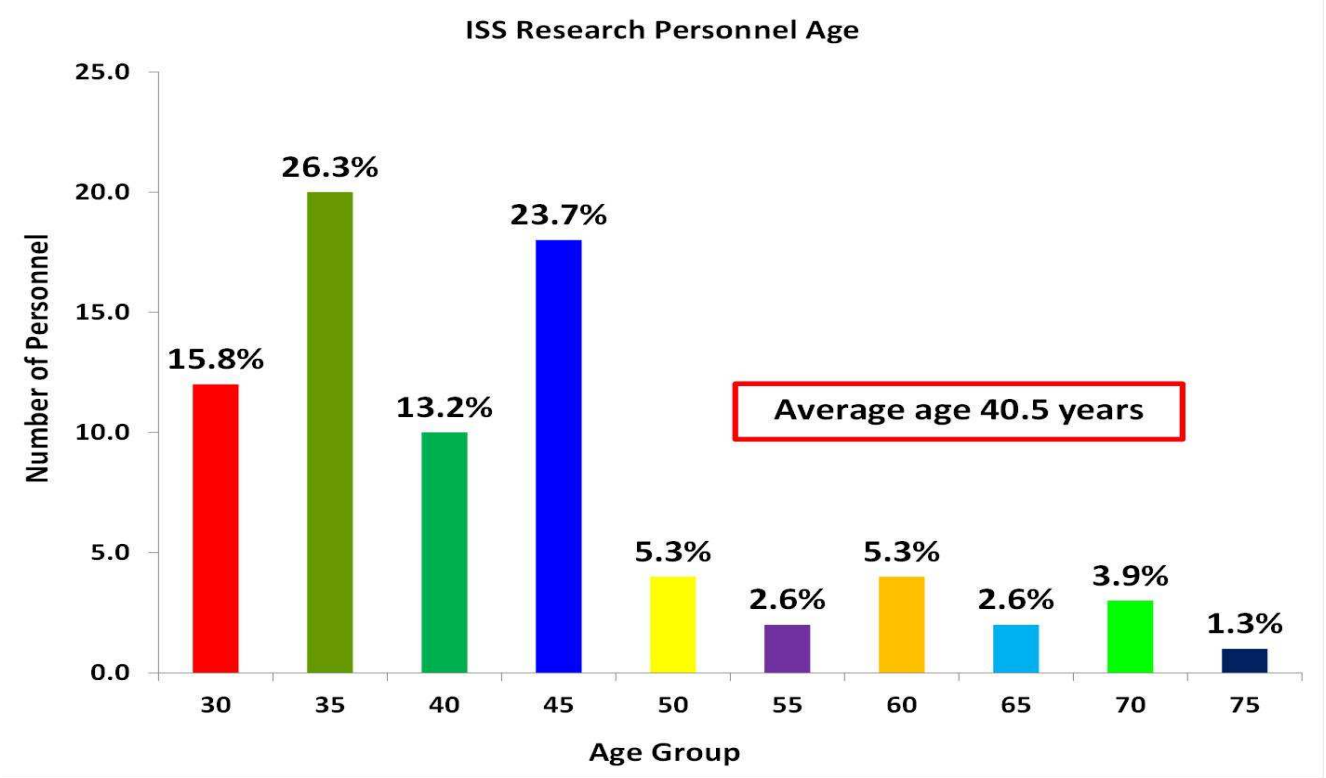
ISS HR PROFESSIONAL TRAINING



HOW WE ACHIVE PERFORMANCE

RESEARCH PERSONNEL

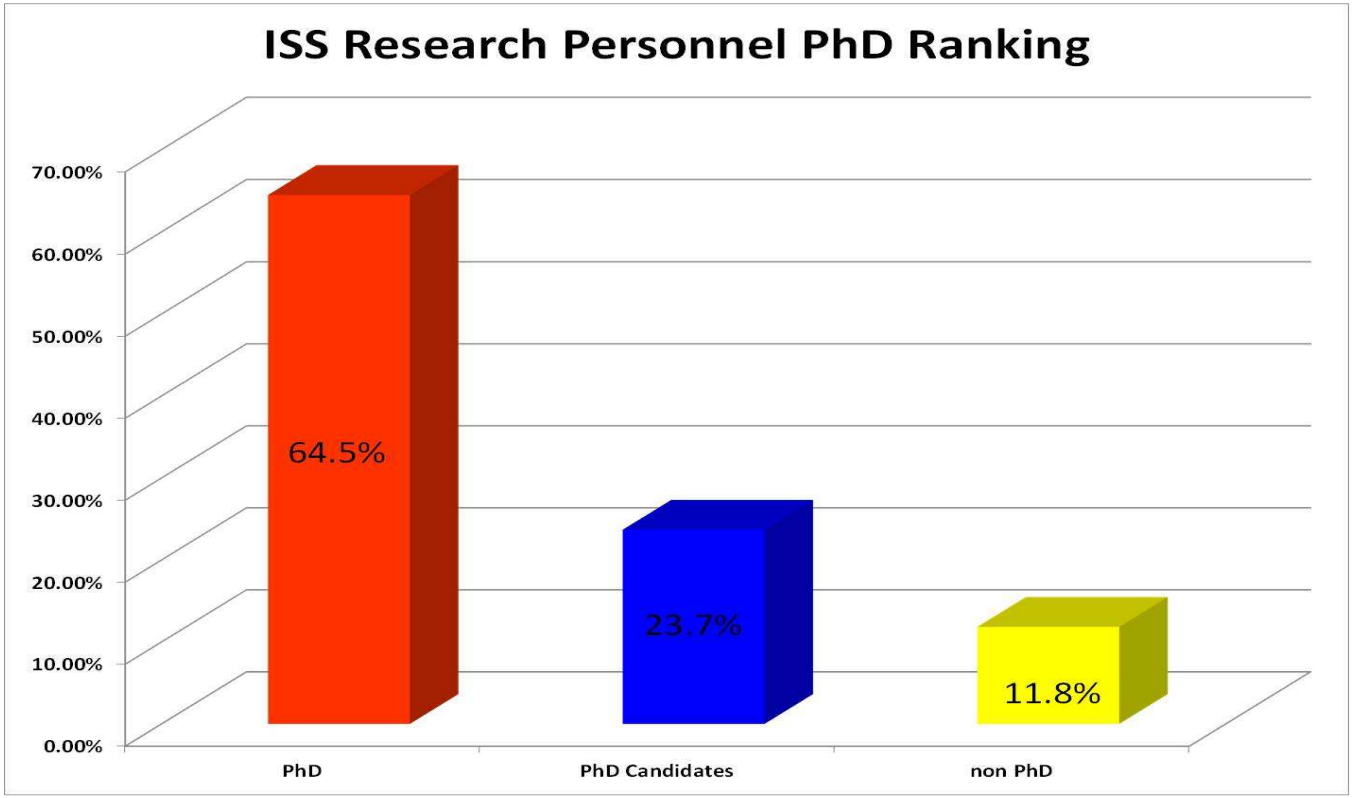
YOUNG AND DEDICATED



HOW WE ACHIVE PERFORMANCE

RESEARCH PERSONNEL

HIGHLY KNOWLEDGEABLE

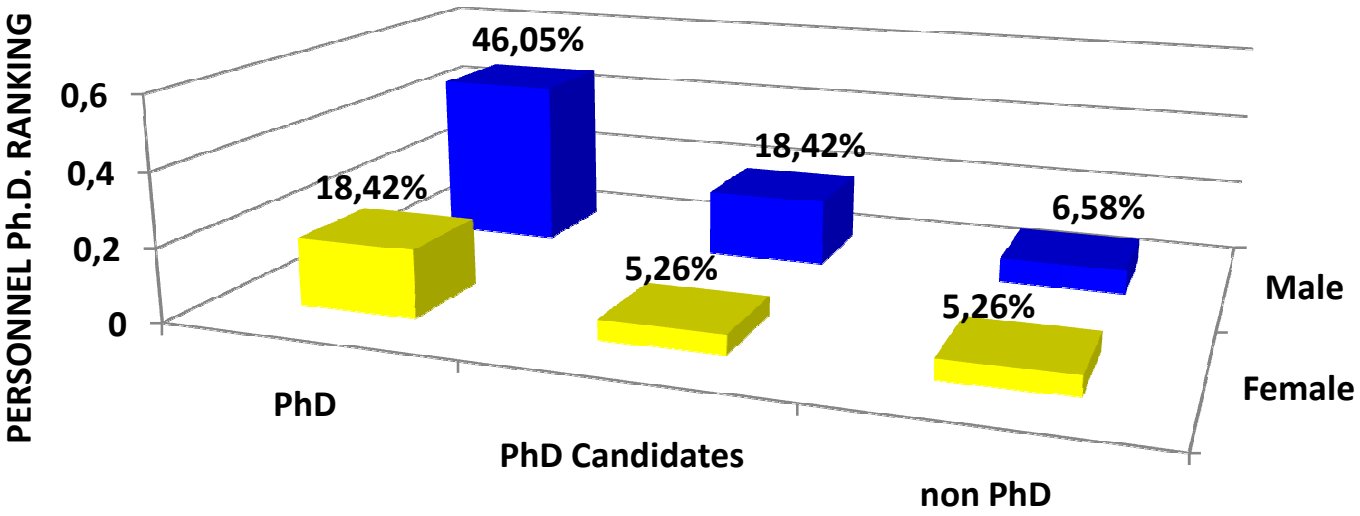


HOW WE ACHIVE PERFORMANCE

GENDER DISTRIBUTION OF THE RESEARCH PERSONNEL

HIGHLY KNOWLEDGEABLE

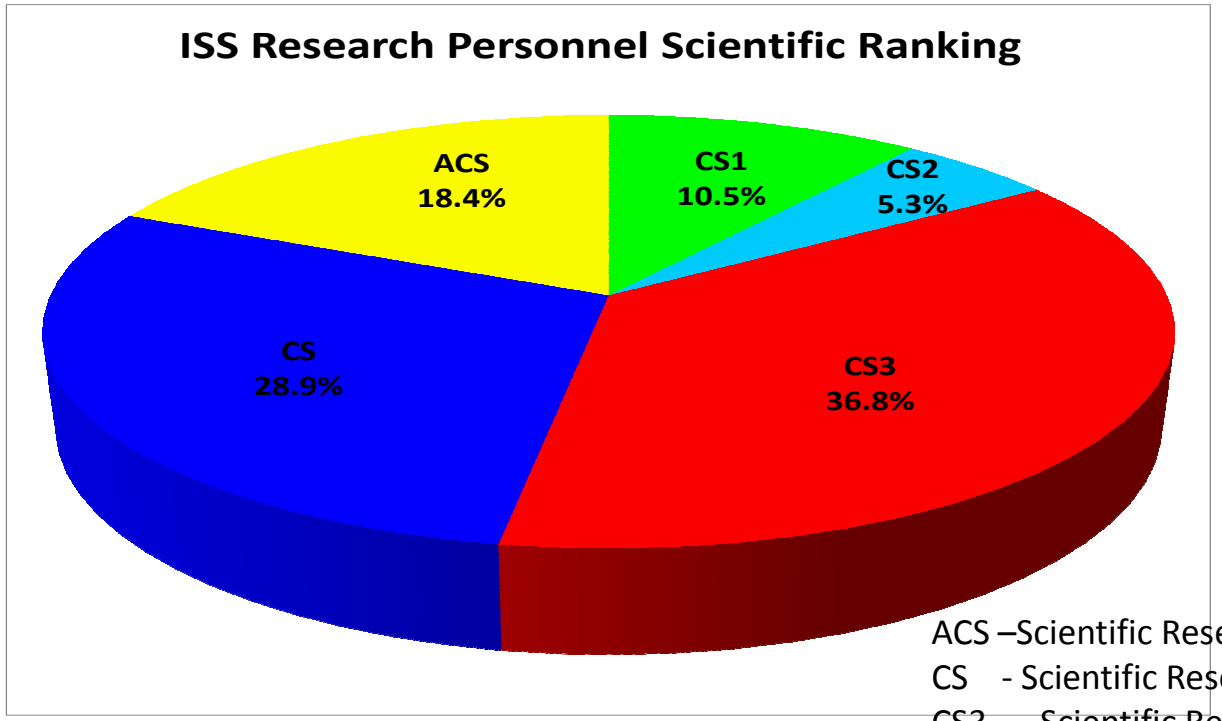
ISS RESEARCH PERSONNEL Ph.D. RANKING



HOW WE ACHIVE PERFORMANCE

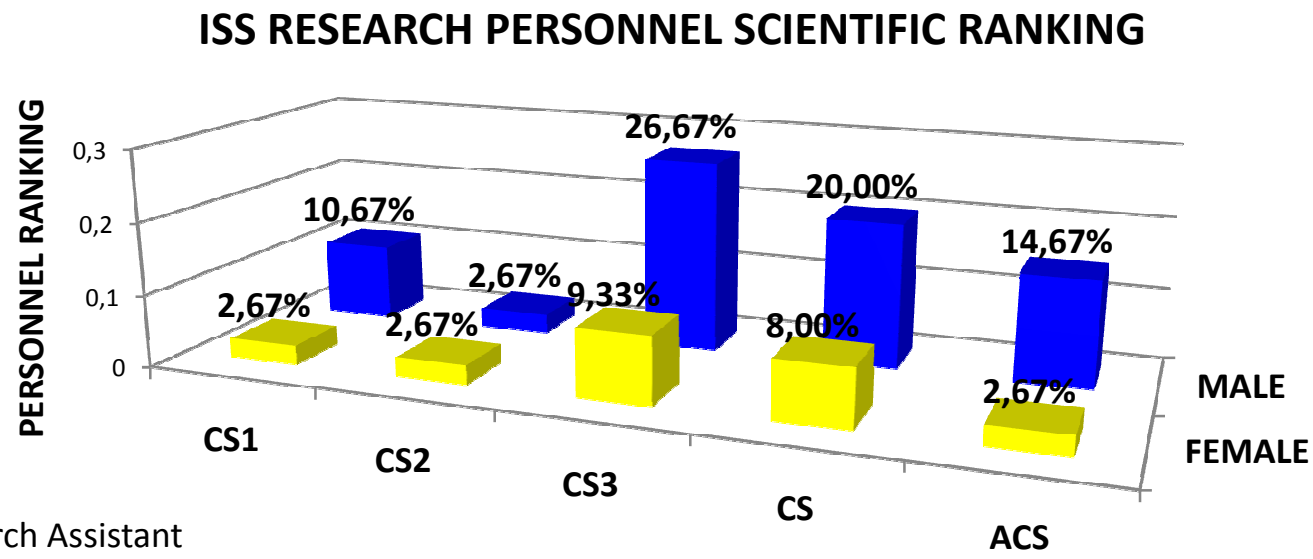
RESEARCH PERSONNEL

HIGHLY EXPERIENCED



ACS –Scientific Research Assistant
CS - Scientific Researcher
CS3 - Scientific Researcher 3rd degree
CS2 - Scientific Researcher 2nd degree
CS1 - Scientific Researcher 1st degree

GENDER RESEARCH PERSONNEL
HIGHLY EXPERIENCED



ACS –Scientific Research Assistant
CS - Scientific Researcher
CS3 - Scientific Researcher 3rd degree
CS2 - Scientific Researcher 2nd degree
CS1 - Scientific Researcher 1st degree

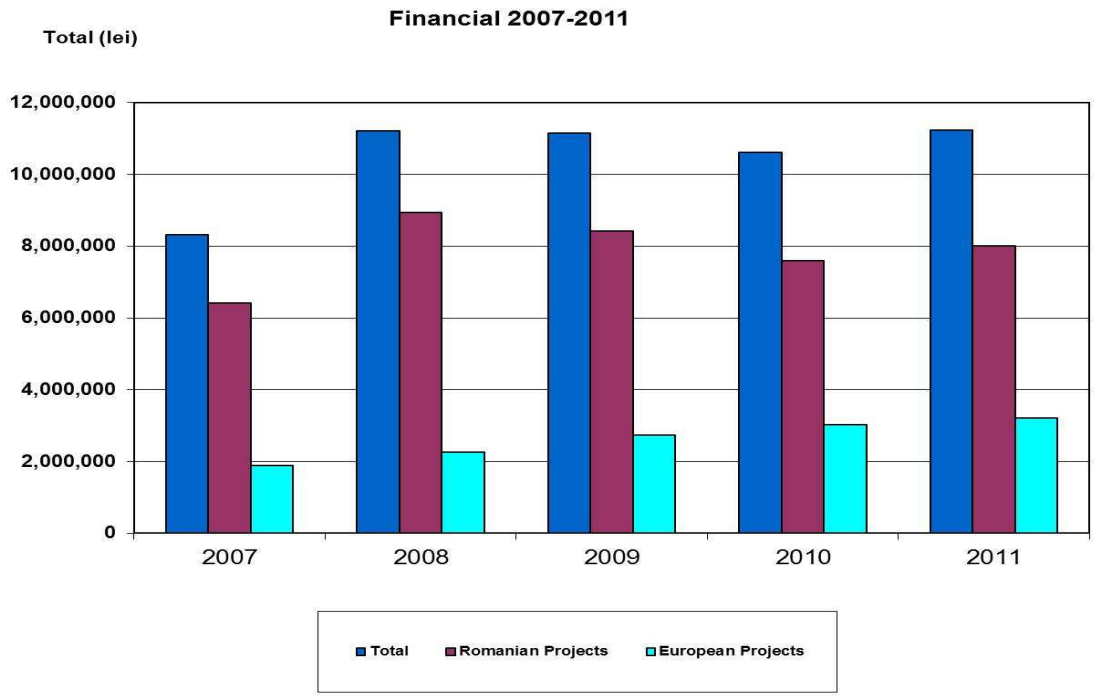

What about ISS
Funds

HOW WE ACHIVE PERFORMANCE

ATTRACTION OF FUNDS

Financial Sources:

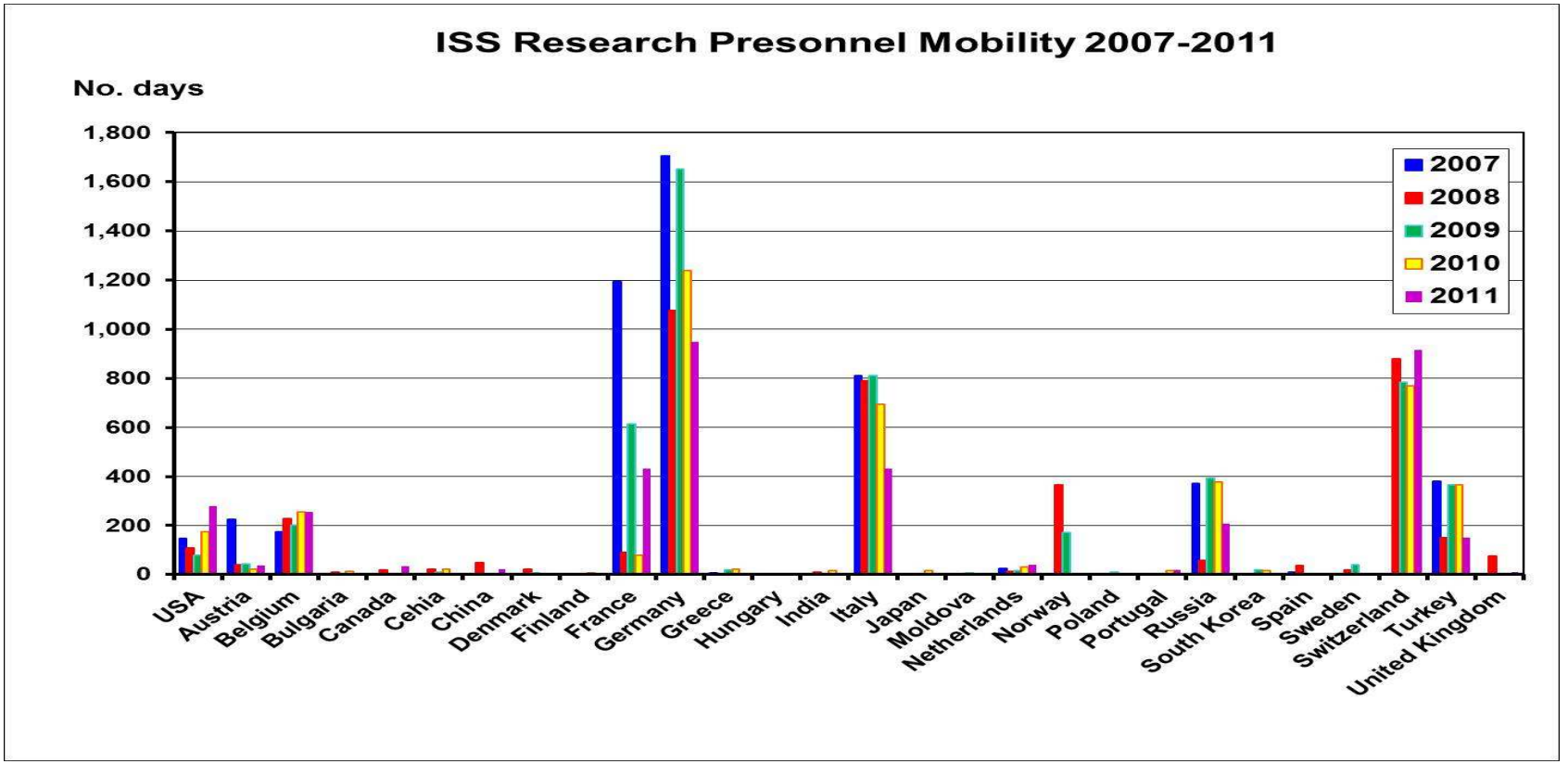
- **National R&D Programs**
- **FP 7**
- **PECS-ESA**
- **Other..**

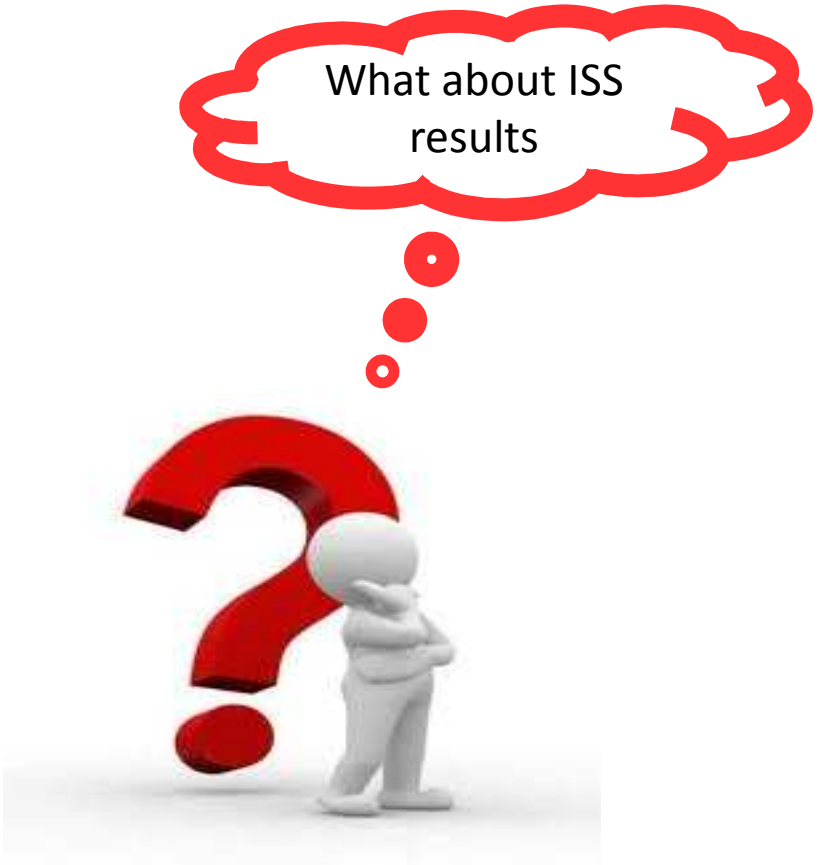



What about ISS visibility

HOW WE ACHIVE PERFORMANCE

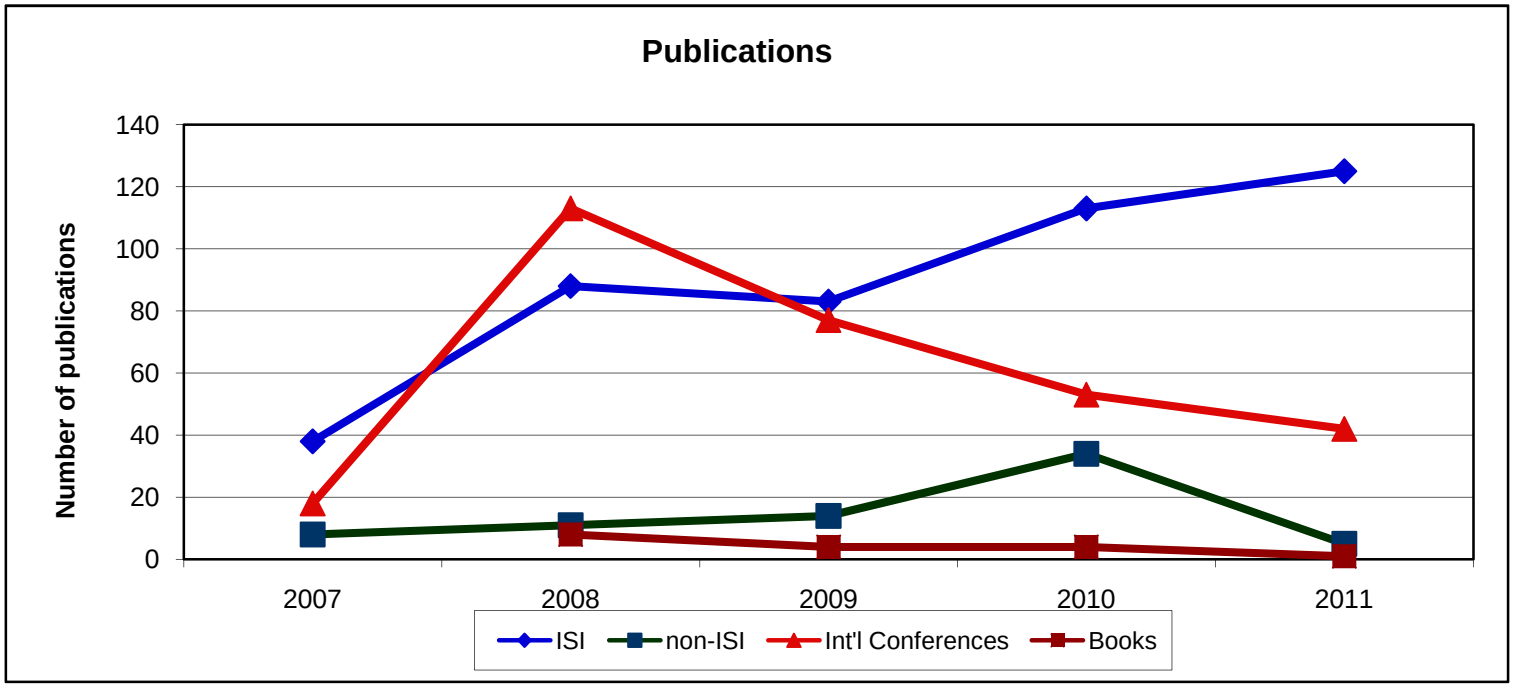
INTERNATIONAL VISIBILITY




What about ISS
results

HOW WE ACHIVE PERFORMANCE

QUALITY RESEARCH



HOW WE ACHIVE PERFORMANCE

QUALITY RESEARCH-HIGH CITATION PAPERS

Use the checkboxes to remove individual items from this Citation Report
or restrict to items published between 1970 and 2012 Go

	2008	2009	2010	2011	2012	Total	Average Citations per Year
	977	1645	1636	2530	395	11859	282.36
1. Title: **Quark-gluon plasma and color glass condensate at RHIC? The perspective from the BRAHMS experiment** Author(s): Arsene I; Bearden IG; Beavis D; et al. Source: NUCLEAR PHYSICS A Volume: **757** Issue: **1-2** Pages: **1-27** DOI: **10.1016/j.nuclphysa.2005.02.130** Published: **AUG 8 2005**	101	138	110	138	24	781	97.62
2. Title: **Measurement of the atmospheric neutrino-induced upgoing muon flux using MACRO** Author(s): Ambrosio M; Antolini R; Aramo C; et al. Group Author(s): MACRO Collaboration Source: PHYSICS LETTERS B Volume: **434** Issue: **3-4** Pages: **451-457** DOI: **10.1016/S0370-2693(98)00885-5** Published: **AUG 27 1998**	6	13	3	5	2	334	22.27
3. Title: **Transverse-momentum spectra in Au plus Au and d plus Au collisions at root s(NN)=200 GeV and the pseudorapidity dependence of high-p(T) suppression** Author(s): Arsene I; Bearden IG; Beavis D; et al. Group Author(s): BRAHMS Collaboration Source: PHYSICAL REVIEW LETTERS Volume: **91** Issue: **7** Article Number: **072305** DOI: **10.1103/PhysRevLett.91.072305** Published: **AUG 15 2003**	13	9	5	13	1	244	24.40
4. Title: **Variable very-high-energy gamma-ray emission from the microquasar LS I +61 303** Author(s): Albert J; Aliu E; Anderhub H; et al. Source: SCIENCE Volume: **312** Issue: **5781** Pages: **1771-1773** DOI: **10.1126/science.1128177** Published: **JUN 23 2006**	47	51	31	23	4	219	31.29
5. Title: **Evolution of the nuclear modification factors with rapidity and centrality in d+Au collisions at root(NN)-N-S=200 GeV** Author(s): Arsene I; Bearden IG; Beavis D; et al. Group Author(s): BRAHMS Collaboration Source: PHYSICAL REVIEW LETTERS Volume: **93** Issue: **24** Article Number: **242303** DOI: **10.1103/PhysRevLett.93.242303** Published: **DEC 10 2004**	15	19	16	32	2	196	21.78


What about ISS technology development

HOW WE ACHIVE PERFORMANCE

TECHNOLOGY DEVELOPMENT

Space Science and Technology Center

- Description:
  - Basement - Data Center, CleanRoom, Utilities
  - 1st floor – Electronic lab
  - 2nd ,3rd floors-Offices
  - Technological Roof – telescopes, satellites antenna, space science experiments

Status: under construction

What are our
Managerial Tools

ERP @ ISS

Institute of Space Science has chosen a modern ERP(Enterprise Resource Planning) solution: EMSYS -Enterprise Management System

Components:

- **HR & payroll**
- **Financial**
- **Logistic**
- **Business Intelligence**
- **Project Management (available end of 201**

Features:

-Oracle DB

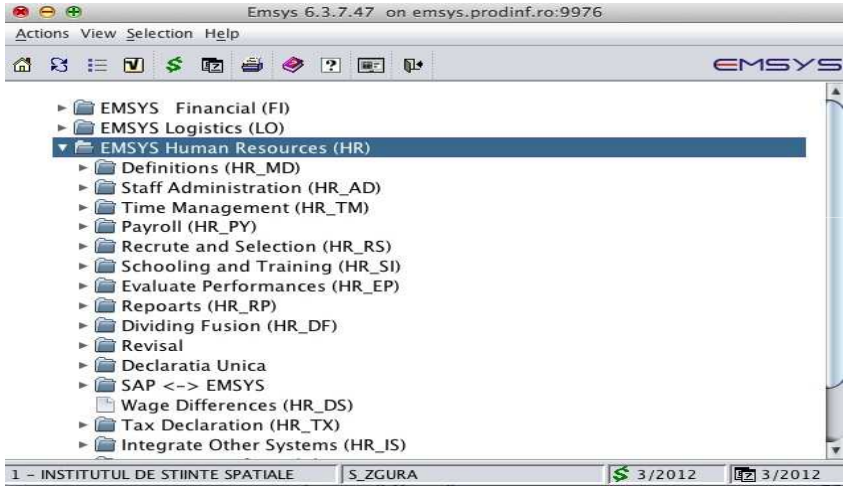
-Java WebStart GUI

-cross platform

(Windows, Linux, Mac OX)

ERP –HR&PayRoll @ ISS

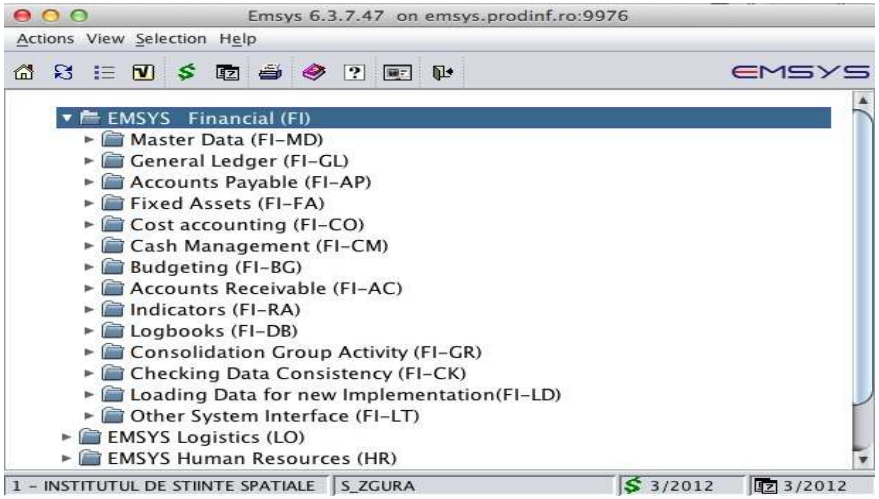
- **Staff Management**
- **Organization chart**
- **Time Management**
- **Payroll**
- **Recruite and selection**
- **Scholarship and Training**
- **Performances Evaluation**
- **Reports**
- **Tax Declarations and Taxes**
- **Other systems integration: SAP Fl, CO and HR.**



ERP – FI @ ISS

EMSYS Financial offers an overview on the financial situation of the ISS in real time.

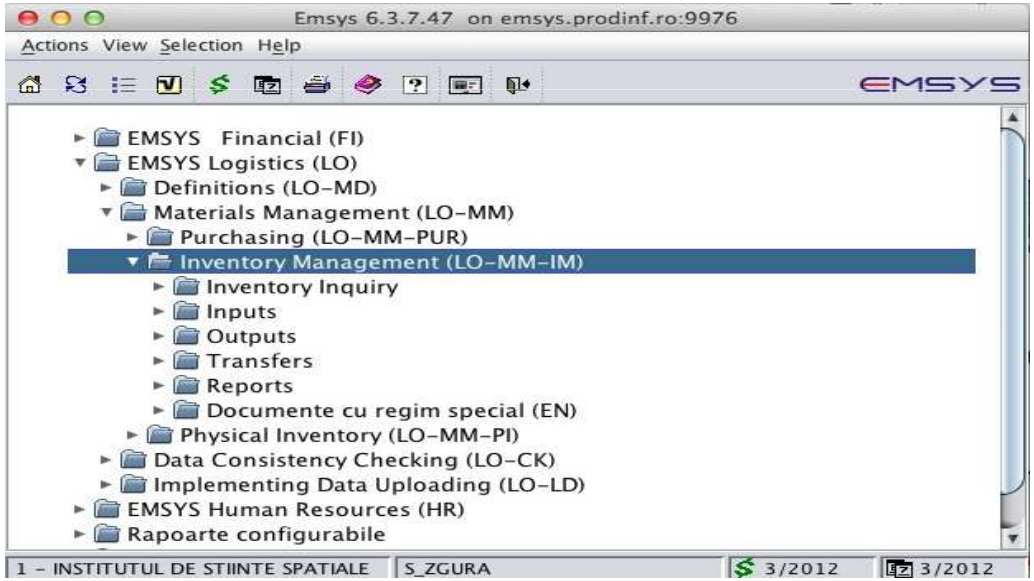
- **Financial Accounting.**
- **Multiple accounting**
- **Accounts Payable/Receivable**
- **Fixed Asset.**
- **Cost Accounting.**
- **Cash Management.**
- **Budgets**
- **Indicators.**
- **Logbooks.**
- **Financial Consolidation.**



ERP – LO @ ISS

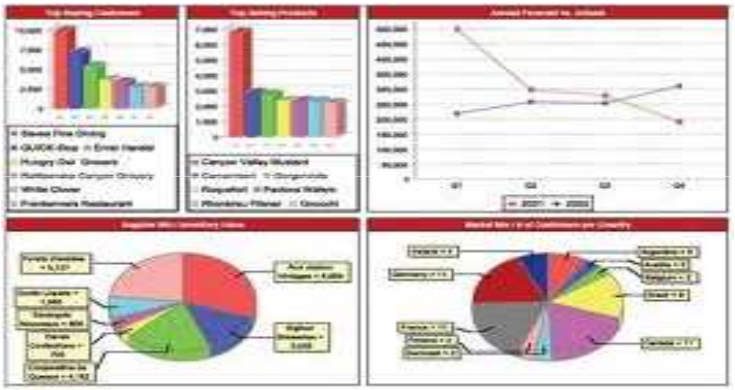
EMSYS Logistics controls in real time processes for Purchasing, Manufacturing, Sales and Inventory Management of goods, packing, raw material, materials, inventory small objects, protection and work equipments.

- **Sales and Distribution**.
- **Manufacturing**.
- **Purchasing**.
- **ALOP**(Commitment, Liquidation,
- Ordering, and Payment)
- **Inventory Management**.



ERP – BI @ ISS

- Financial Analysis
- HR Analysis
- Procurements Analysis
- Planning, Budgeting and Forecasting
- Profitability and Cost Management
- Business Indicators



Operational Procedures @ ISS

The ISS participation in the ESA missions and critical Space and Security collaboration through National Critical Infrastructure requires:

- ISO 9001:2008 Quality Management Systems
- ISO 27001:2005 Information Security Management Systems (will start in 2013)
- ISO 14001 Environmental Management System (will start in 2014)

QSCert

We cover credibility

QSCert, spol. s.r.o.
Management Systems Certification Body

by this

CERTIFICATE

certifies that the Quality Management System of

INSTITUTUL DE STIINTE SPATIALE - INCDFLPR

Str. Atomistilor, Nr. 409, Magurele, Ilfov, Romania

has been established and duly implemented and company applies it in accordance with the standard

ISO 9001:2008

provisions for the following areas:

Research and development in other natural science and engineering.

Certified locations: Str. Atomistilor, Nr. 409, Magurele, Ilfov, Romania

On the basis of certification audit, protocol No. **C 2219/12**, it was proven that the management system meets the requirements of the above listed standard.

Certificate No.: Q - 6176/12
Date of issue: 22.08.2012
Expiry date: 21.08.2015

IAF

S 3177

This certificate is valid only if it is published among valid certificates on www.qscert.com

Ing. Roman Slúch
business director

Thank you very much!

What is the Instutional Development Plan for next 4 years

MISSION AND VISION

For more than half a century, the Institute of Space Science (ISS) mission – under its various names and affiliations – has been to carry out fundamental and advanced scientific and engineering research in cosmic rays physics, high energy physics, astrophysics and the development of space technology and applications through national and international projects and collaborations. The ISS R&D policy has always been one of "covering all bases in the field", from pure theory to data acquisition, processing and interpretation and from the drawing board to complex instruments and satellites operating in space as well as "terrestrial" applications of space assets.

As such, the ISS vision for the future is quite straightforward: to improve and expand Romanian participation to the worldwide efforts for the peaceful investigation of cosmic space and for the development of new technologies designed to improve the quality of life on our planet. We also consider it our mission to preserve and further develop Romanian space capabilities and expertise through excellence, efficiency and performance in leading-edge scientific research.

What is the Scientific
SWOT Analysis

SCIENTIFIC SWOT ANALYSIS

Strengths

- *Position of national leadership in space science R&D activities.*
- Strong and broad scientific programs and research activities related to the preparation of Romania's adhesion to the ESA (through PECS), as well as, after adhesion (at the end of 2011) the participation to ESA scientific and technology programs.
- Strong and broad scientific programs and research activities in agreement with the National R&D plan.
- *Strong participation in international space programs (ESA, NASA), in major international institutes (CERN, JINR) and collaborations (BECQUEREL, ALICE, EUCLID, PLANCK, ANTARES, KM3NeT, Pierre Auger Observatory, FCAL, COST).*
- Strong national institutional partnerships with renowned universities (University of Bucharest, Bucharest, "Politehnica" University, etc) and institutes (IFIN-HH, INFLPR, INCDFM, etc) and companies.
- Internationally renowned team leaders.
- *Top qualified research personnel with broad fields of expertise in astrophysics, cosmology, astroparticle physics, high-energy physics, theoretical and experimental gravity, space engineering and space activities management.*
- Well-developed research groups, capable to carry highly interdisciplinary projects.
- *Positive influx of young scientists trained abroad (EU, USA, Canada,etc).*

SCIENTIFIC SWOT ANALYSIS

Weaknesses

- Lack of stronger dedicated technological and experimental infrastructure.
- Lack of knowledgeable and experienced technical support personnel.
- Absence of a coherent program for training managers of all levels in the institute.
- Poor interest of Romanian technical and technological SME's and companies that could capitalize on institute's research results.
- Low technical and technological level of Romanian companies that could capitalize on institute's research results.
- Poor availability of national high-tech companies interested in the transfer of advanced technology.
- Insufficient number of young university graduates with proper background for a scientific and high-tech career.
- Insufficient mass media exposure at the national and international level.

SCIENTIFIC SWOT ANALYSIS

Opportunities

- Getting stronger integration in the R&D national and ESA space science programs.
- Getting stronger presence in international R&D space and related science programs (FP7, ESA, CERN, NUSTAR-FAIR, GSI, and NASA).
- Getting stronger implication in the national educational system at all levels.
- Experience and achievements in applications concerning human space flight countermeasures, space for health and space for security with immediate potential of valorization at the level of international cooperation in space domain as well as at the level of terrestrial spin-off.

SCIENTIFIC SWOT ANALYSIS

Threats

- National level: instability of Government's science and research policies and practices which puts in jeopardy the long term development and human resources stability.
- Regional level: competition from similar institutions in the former Eastern Bloc.
- Ineffective purchasing and acquisition system, which is incompatible with a fast paced research environment.
- Lack of legal framework to make private investments attractive to potential investors.

What are the Strategic Scientific Objectives and Directions?

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O1. Involvement in ground-based experiments of national and international interest.

- D1.1 Neutrino astrophysics, multi-messenger astronomy with neutrinos, gamma and ultrahigh energy cosmic rays (participation at ANTARES, KM3NeT, DWARF, Pierre Auger Observatory).
- D1.2 Search of exotic particles and phenomena in cosmic rays and colliders/accelerators beams (participation at ANTARES, KM3NeT, LHC-ALICE-CERN, MoEDAL – CERN, NUSTAR-FAIR-GSI, ILC, NICA-JINR DUBNA, NUCLOTRON-JINR DUBNA).
- D1.3 Innovative particle detection techniques with applications to large scale ground-based experiments (e.g. FCAL).
- D1.4 Search for astronomical and astrophysical signatures of Weak Equivalence Principle (WEP) violations.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O2. Involvement in satellite space missions of international interest.

- D2.1 Investigation of solar system plasmas by satellite observations (e.g. by participation to the ESA missions Cluster, Venus Express, Swarm, Solar Orbiter and to the NASA missions THEMIS and MMS).
- D2.2 Participation to ESA scientific missions for the search of dark matter, dark energy and modified gravity (PLANCK, EUCLID, CoRE)

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O3. Involvement in the International Space Station

- exploitation as a space platform for scientific and technological experiments.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O4. Development of space science technology facilities.

- D4.1 Development of satellite instrumentation.
- D4.2 Development and integration of microsatellites for space applications (GOLIAT).
- D4.3 Development of a competitive integrated satellite ground testing facility.
- D4.4 Development of a competitive satellite missions and communication centre.
- D4.5 Development of a comprehensive testing and simulation facility for human space flight countermeasures.

O5. Development and improvement of a strong computational and theoretical infrastructure to support the strategic plan objectives:

- D5.1 Development and improvement of large scale High Performance Computing (HPC) facilities for high energy physics, space science, astrophysics, and applications (e.g. GRID sites for the ALICE-CERN Collaboration, GPU computing, ESA-PLANCK, FAIR-NUFAR-GSI).
- D5.2 Stronger involvement in the study and numerical modelling of complex processes and structures in theoretical astrophysics, gravitation, cosmology, and physics of the violent Universe.

STRATEGIC SCIENTIFIC OBJECTIVES AND DIRECTIONS

O6. Integration of the ISS activities in national and international space applications of social and strategic interest, with the possibility of technological transfer to public, private and strategic partners:

- D6.1 Disaster management.
- D6.2 Mobile, in-field, satellite communication telemedicine for critical situations response.
- D6.3 Weather surveillance.
- D6.4 Remote sensing.
- D6.5 Countermeasures to human space flight in adverse conditions

Human Resources Strategy

Objectives:

1. To support the development and operation of the ISS as a research institute responsive to individual and organizational needs.
2. To provide high quality human resource services to the ISS scientific and non-scientific community.
3. To ensure the ISS fulfills its statutory and audit requirements.
4. To monitor organizational and individual performance.
5. To identify, promote and implement responsible social and economic policies and practices.
6. To introduce and support effective management systems, organisational structures and practices.

Human Resources Strategy

A.1 Development and improvement of the quality and potential of human resources

- Though thorough and performant hiring procedures and practices.
- By providing flexible working hours for scientists involved in M.Sc. and Ph.D. programs.
- By encouraging leading research scientists to apply for a position as PhD supervisors, certified by the Romanian Education and Science system.
- By providing training and support for continuing education through workshops, courses and national and international postdoctoral fellowships.
- By avoiding discrimination through legal equal opportunity practices and policies.
- Through efficient and performant integration and reintegration of returning Romanian scientists and of those who were trained abroad.
- Through thorough and fair personal evaluation and professional advancement criteria as established by law and by the Scientific Council.
- By encouraging and supporting ISS collaborations with the academic and industrial environments.
- By setting up an active outreach programs and policies to attract and recruit outstanding students from renowned Romanian Universities.
- By setting up national and international exchange programs for students, postdoctoral fellows and scientists.
- By encouraging and supporting the ISS research scientists to become members of international

A.2 Improvement of management performance

- Through efficient identification of staff development needs and implementation of appropriate programs supporting the areas of strategic interest.
- By providing appropriate rewards and recognition for outstanding performance.
- By providing flexible and efficient employment options.
- By improving the administrative and human resource structure of the ISS.
- By encouraging and developing the flexibility, multitasking abilities and problem solving skills of the ISS non-scientific staff.
- By settting up and enforcing general and specific staff misconduct

Mechanisms for Stimulating the Appearance of New Research Directions

(I) Participation in national and international projects and collaborations

- By using the ISS experience and expertise to identify scientific and technological needs and opportunities at the national and international level and to provide timely and efficient solutions.
- By using the ISS scientific track-record to propose and become involved in new cutting-edge R&D projects, partnerships and collaborations at the national and international level.

Mechanisms for Stimulating the Appearance of New Research Directions

(ii) Participation in national and international educational activities

- By strengthening the ISS involvement in national and international higher-education activities (e.g. B.Sc, M.Sc, Ph.D., postdoc and visiting scientists' supervisory and exchange programs).
- By improving and further developing outreach programs at all educational levels.

Mechanisms for Stimulating the Appearance of New Research Directions

(iii) Improvement of research infrastructure

- By creating a highly versatile computational user-facility based on the already existent ISS HPC network in order to provide the ISS scientists and those from other national and international research institutions with flexible and performant computational support.
- By modernizing, improving and further developing the experimental capabilities of the ISS in order to broaden its range of technological expertise and to further open it to the national and international scientific and industrial market (e.g. space instrumentation and microsatellite development, fabrication and testing, integration of space technology complex applications, instrumentation and components for future ground based astroparticle physics experiments.).

Mechanisms for Stimulating the Appearance of New Research Directions

(iv) Improvement of the national and international visibility and scientific standing

- By fostering the development of new national and international collaborations with other research institutes and universities.
- By supporting the ISS research groups and individual scientists to disseminate the results of their scientific endeavors and to increase their national and international visibility through organization and participation to national and international conferences, workshops and lectures.
- By providing the ISS scientists with access to the latest information in the field through performant journal subscription packages.
- By encouraging and supporting the ISS scientists to publish the results of their research in highly ranked scientific journals (ISI ranked and otherwise).
- By providing efficient integration in the ISS scientific activities for returning Romanian scientists.


What Financial SWOT Analysis?

Financial SWOT Analysis

Strengths

- Increasing number of national and international research contracts due to the high visibility, scientific standing and expertise of the ISS.
- Current financial operational stability (salaries, taxes, suppliers).
- No financial debt.
- Admission of the ISS as a part of Romanian full ESA membership.
- Availability of transfer-ready technologies.

Financial SWOT Analysis

Weaknesses

- Lack of a significant supporting investment fund.
- Delay in the completion of the new Center of Space Science and Technology (CSST), which has slowed down the technological development and endowment of the ISS.

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Financial SWOT Analysis

Opportunities

- Romania's commitment to increase the research budget to 3% of the GNP by 2020
- New R&D financing mechanisms (e.g. the Laboratory Twinning type of grant to be introduced by the ANCS in 2012 and the National Technology and Innovation Program).
- Participation in the ESA scientific and technology programmes.
- Participation in the ESA-approved newest research projects (e.g. EUCLID),
- Participation in the international major projects CERN-ALICE, CERN-WLCG, FAIR-GSI and in the FCAL ILC International Collaboration.
- Full involvement in the ANTARES and KM3NeT undersea neutrin

Financial SWOT Analysis

Threats

- The continuation and possibly deepening of the present economic recession, which can jeopardize the R&D budget allocation at the national and international levels.
- Rigid, cumbersome and bureaucratically extensive government funding policies and practices.
- The Government's science and research policies and practices of readjusting the funding for already awarded grants and projects.
- Poor diversity and efficiency of high-tech equipment suppliers.
- Lack of adequate legislation to attract private investors.

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SCIENTIFIC SWOT ANALYSIS

The trends of the above financial SWOT analysis show that – barring a worst case scenario of national and international economic meltdown – the ISS is in good financial standing to carry out in full its strategic development plan through the proposed methods and mechanisms.

What : **Investment Plan and Strategy**?

Infrastructure: Investment Plan and Strategy

The goal of this plan is to ensure a coherent and smooth implementation of the mechanisms and actions proposed for the implementation of the 2012-2016 strategic development plan.

Under these circumstances, the ISS resource investment strategy is focused on the following specific objectives:

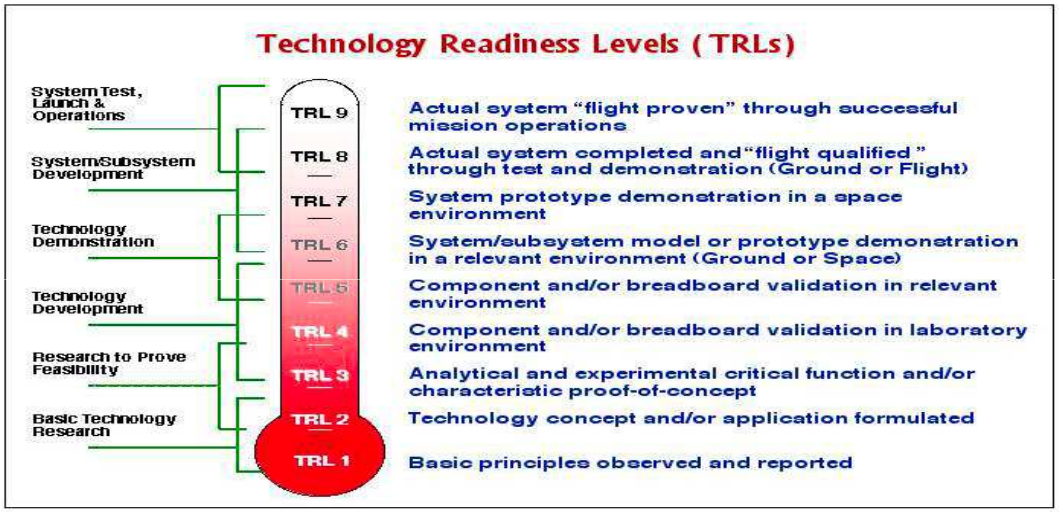
1. Increasing the ISS presence in the space science national and international research programs and collaborations.
2. Increasing the ISS visibility and scientific standing in the national and international space science community.
3. Further developing the ISS computational facilities.
4. Finalizing the construction of “the Space Science and

What about Technology Transfer and Attraction of Non-public Funds?

Technology Transfer and Attraction of Non-public Funds

- Space weather surveillance and forecast
- Light pollution monitoring
- Cosmic shower detectors for educational uses
- Critical situation response support for human health and security

Technology Transfer and Attraction of Non-public Funds



Moreover, the ISS intends to take advantage of the National Technology and Innovation Program whose aim is to bring together consortia of research institutes and universities with the public and private sector for the development of a medium-term applied research program with significant social and economic impact. The ISS plans to use this program to

What about Strategic Partnerships and Visibility?

Strategic partnerships

National partnerships and collaborations:

- Romanian Space Agency,
- National Institute for Nuclear Physics and Engineering
- National Institute for Laser, Plasma and Radiation Physics
- National Institute for Material Physics
- University of Bucharest.
- SMURD
- National Institute for Sports Research

Strategic partnerships

International partnerships and collaborations

- R3B Collaboration - FAIR, GSI, Darmstadt, Germany.
- European Space Agency (ESA).
- The Institute of Space Science could assume a leadership role in Romania during the implementation of the strategic partnership ROMANIA - ESA by participation in ongoing (Cluster, Planck, Venus Express) and upcoming (e.g. Swarm, Solar Orbiter, Euclid) ESA missions.
- LHC - CERN, Geneva, Switzerland.
- JINR Dubna, Russia.
- FCAL-ILC (International Linear Collider).
- ANTARES Collaboration
- KM3NeT Consortium
- Pierre Auger Observatory Collaboration.

Strategic partnerships

Bilateral government agreements

- European Space Agency
- CERN, Geneva, Switzerland
- NUSTAR, GSI, Darmstadt, Germany
- Joint Institute for Nuclear Research, Dubna, Russian Federation

Vizibility

- ISS will increase the number and quality of scientific output in ISI ranked journals.
- ISS visibility within the space science community is through the participation and organization of
  conferences, workshops, lectures and summer schools.
- ISS will encourage and supported the scientists exposure to mass media attention
- Production the media scientific content and disseminate thought (homepage, facebook, twiter, etc)


What about ISS gratitude?