



# **Attivita' istituzionali dell'ASI in tema di accesso, permanenza ed esplorazione dello spazio**

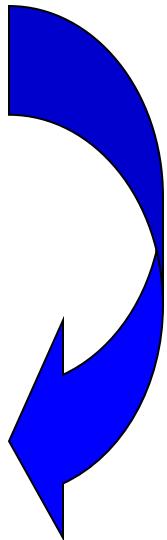
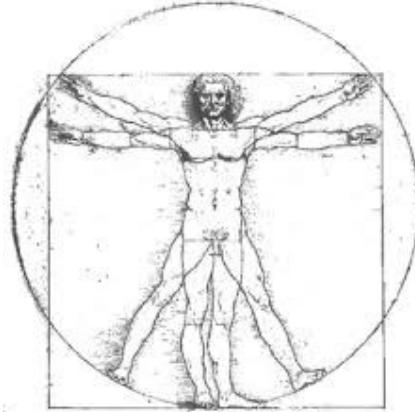
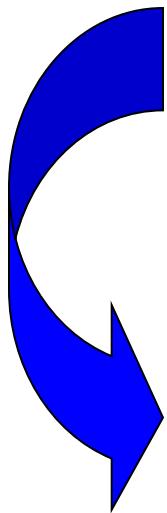
## **M.Cosmo**

*Space Renaissance Italia, First National Congress*

*May 8th and 9th 2014, Milan, Italy*



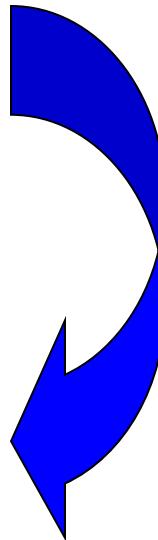
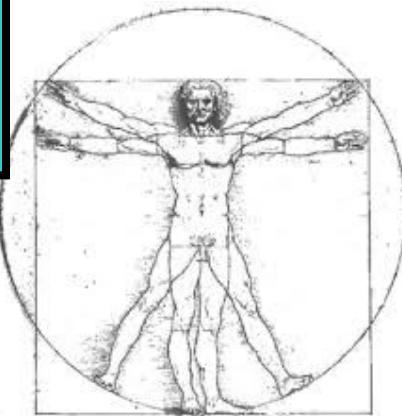
Benessere



Conoscenza



- Clima
- Controllo Territorio
- Emergenze
- Servizi
- Supporto enti preposti alla difesa civile e militare

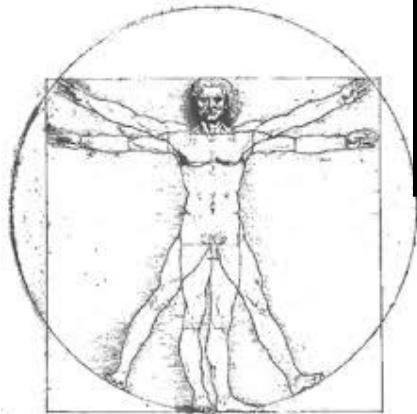
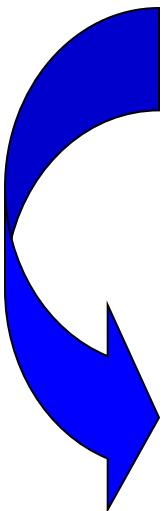


Conoscenza

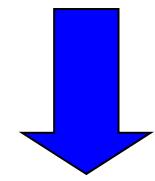
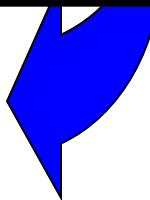




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- Pianeta Terra
- Astronomia & Astrofisica
- Energie Rinnovabili
- Nuovi Materiali
- Medicina e Biologia

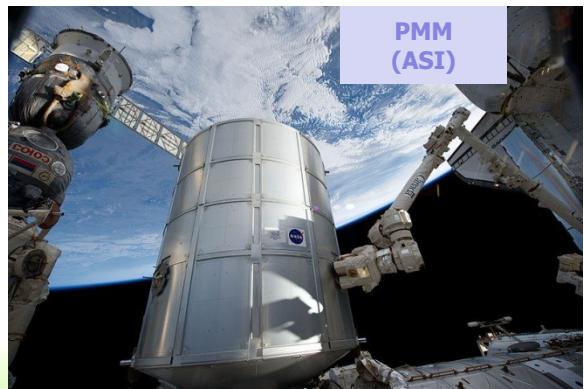
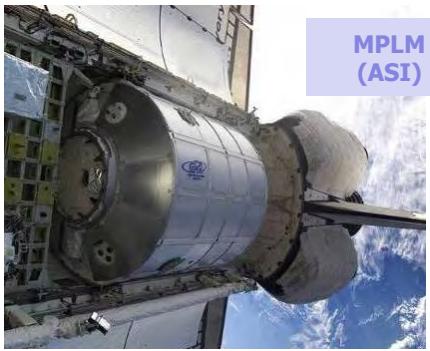


Futuro .....





# Most of the habitable parts of the ISS have been built in Italy



## *ANALYSIS*

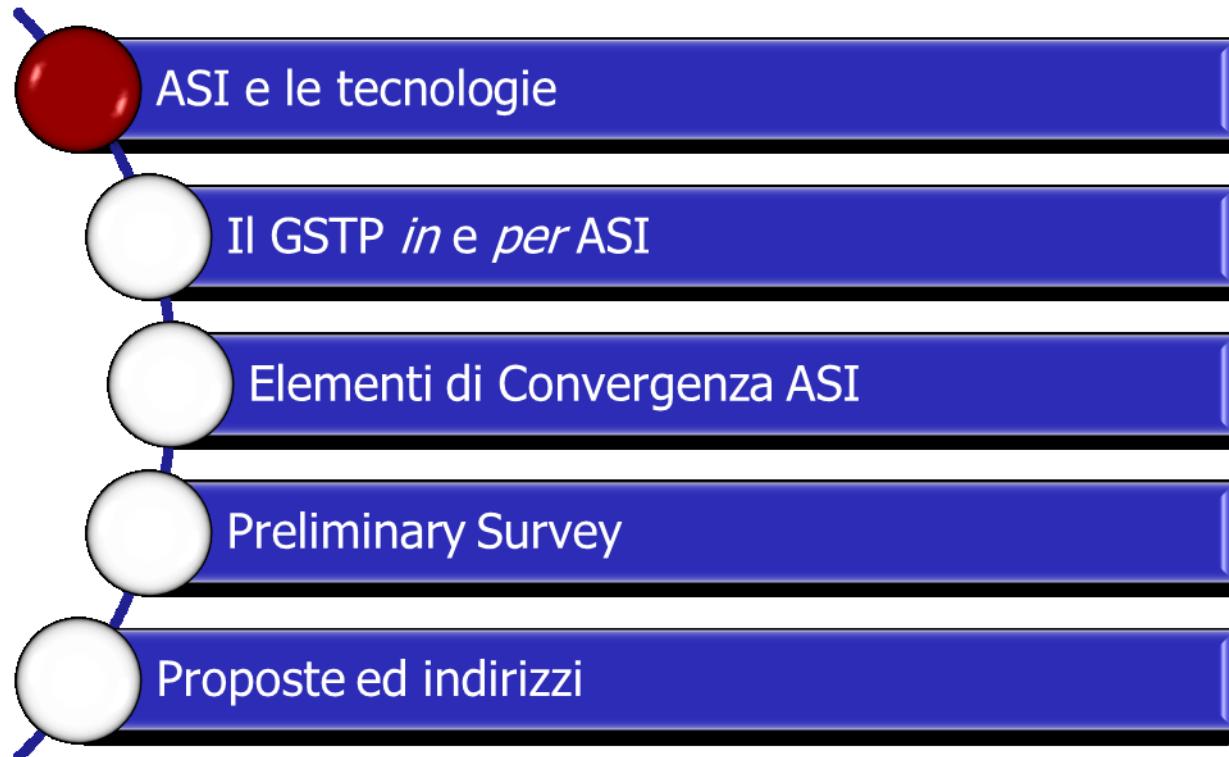
— In 2014-2016, plans for national technology review (scenario analysis) and technology pre-developments under the following criteria:

- Technical assessment: enabling technologies, technical feasibility, TRL
- Strategic assessment: potential applications, expertise, national investments, know-how, existing excellence, non dependability
- Economic assessment: commercial potential, technology transfer opportunities

— Main Technology areas identified:

- Regenerative/closed-loop and life support systems
- Precision landing (GNC, autonomous vision based navigation)
- Sampling technologies
- Docking and capture mechanisms
- Crew Collaborative Robotics
- Inflatable and deployable structures
- In Situ Resources Utilization (ISRU)

# Tools



# ASI Technology Plan

ASI Strategic Guidelines call for investments in the following domains:

- Earth Observation and Cosmo-SkyMED;
- Navigation;
- Launchers and Space Transportation;
- Human Exploration and e Microgravity;
- Observation and Exploration of the Universe;
- Telecommunication e Integrated Applications;
- Transversal Technology.

## The opportunities

- SME
  - Materials, Components and Sensors
  - Earth Observation
  - Telecommunications
  - Navigation

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- ASI e le tecnologie
  - Il GSTP *in e per* ASI
  - Elementi di Convergenza ASI
  - Preliminary Survey
  - Proposte ed indirizzi

# GSTP and ASI

## → General Support Technology Programma / GSTP

- GSTP Phase 3 (22 M€), 22 contracts
- GSTP Phase 4 (6 M€), 12 contracts
- GSTP Phase 5 (5 M€), 12 contracts

Sold Out

## → GSTP Phase 6 (39,3 M€)

→ CM 2012

→ OH 15% tbc

Nuovo  
Contributo  
CM12

## → ESA

→ Mandatory Programmes: TRP, CTP

→ Optional Programmes: ARTES, EGEPE, EOEP, GSTP, ECI, MREP...

# GSTP for ASI

## GSTP allows:

- Development of Enabling Technologies
- Internationalization
- Standardization
- Scaling Effect (financial, know how, etc.)



## elevant Evaluation Criteria:

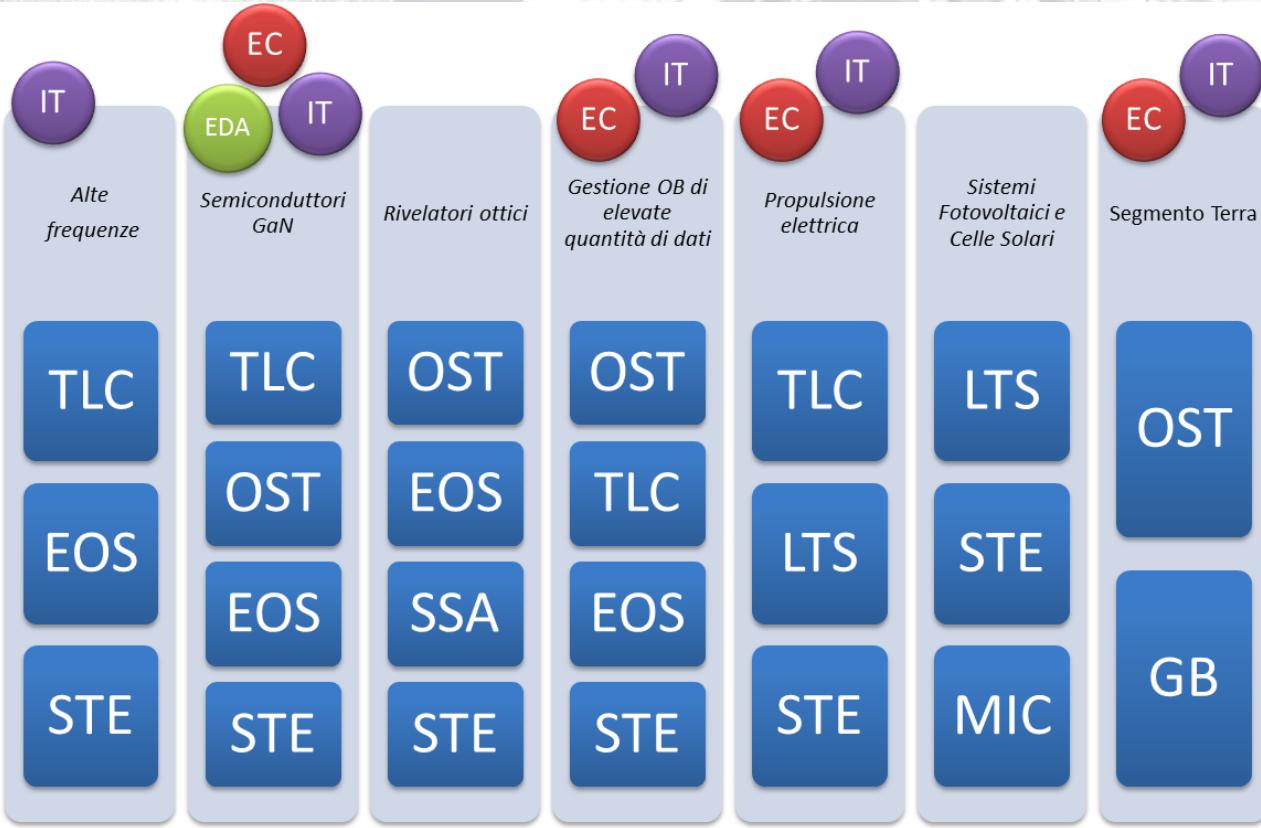
- Technologies for National or ESA Missions (PTA/DVS)
- Market Leadership or II best, strategic research, forefront
- Industrial Policy
- Further Development (e.g Higher TRL's)
- International Cooperation

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# ASI – GSTP Macro Areas

## Elementi di:

- **Technological Convergence,**
- **Applications from Tranversal products,**
- **Matching Funds**



ELEMENTI INRICCATI

# ASI GSTP Specific Examples

## → High Frequencies

- Ka, Q, V and processing chains , T/R tiles High Frequency/Wide Band

## → GaN Semiconductors

- National Capacity, (p.es. HPA),
- Critical technologies for non-dependance: JTF ESA-EDA-EC

## → Optical Devices

- Key Subsystems Development

## → On Board Data Management and Processing

- Enhance Capacity optical, hyperspectral, SAR, TLC, Science etc.
- OBC, PDHT, OBP, DSP...

ELEMENTI INRICCATI

08 - 07 - 2013

DT - CTA



# ASI GSTP Specific Examples (II)

## → Solar Panels and Cells

- Maintaining National Capacity
- Technology Transfer

## → Electric Propulsion

- Interest in High Thrust and Drag compensation,
- Some Markets call for Low-Medium Thrust e.s. TLC SK W/O, new GNSS, AOCS Small/Medium Satellites,

## → Ground Segment

- National Capacity
- European Standardization (EGS-CC)

## Other Domains to be considered:

- RdV & Docking Coo-Obj & Un-Coo-Obj, Formation F.,
- SSA, Clean Space, Composites, EEE

ELEMENTI INRICCATI

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- ASI e le tecnologie
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# National Survey 1/3

## → Preliminary Analysis:

→ Large System Integrators

→ ASI asks ("Scheda StandardProdotto "):

→ Industrial Policy (e.g. The "Line-up"), Medium- Long-term vision, costs envelope, collaborations, new job opportunities

## → The analysis is ongoing:

→ National Research Centers (EPR's, Universities,...)

→ SME

→ non LSI

Dominio Tecnologico	occ	%	n° DITTE	Trasv
On-Board Payload Data Processing	6	8,2%	2	1,17
Data Systems and On-Board Computers	3	4,1%	1	1,67
Microelectronics	2	2,7%	2	5,50
Ground Systems SW	2	2,7%	1	8,00
Solar Generators and Solar Cells	1	1,4%	1	7,00
Power Management & Distribution	1	1,4%	1	1,00
Radiation Environment Models and In Orbit Monitors	1	1,4%	1	1,00
AOCS Sensors and Actuators	1	1,4%	1	6,00
TT&C Transponders and Payload Data Transmitters	8	11,0%	4	2,50
Critical RF Technologies	6	8,2%	3	2,50
Technologies for Passive Millimetre and Submillimetre Wave Instruments	2	2,7%	1	2,00
Freq. & Time Generation - Space	2	2,7%	1	1,00
SAR	6	8,2%	2	2,00
Array Antennas	2	2,7%	1	1,00
Telecommunications Reflector Antennas	3	4,1%	1	1,33
Automation and Robotics	9	12,3%	2	2,11
Position sensors	1	1,4%	1	4,00
Optical Communications for Space	1	1,4%	1	2,00
Technologies for Optical Remote Passive Instruments - Detectors	1	1,4%	1	1,00
Technologies for Optical Passive Instruments (Stable and Lightweight Structures, Mirrors)	6	8,2%	2	1,00
Chemical Propulsion - Components	1	1,4%	1	5,00
Electric Propulsion (including Flow Control Systems)	2	2,7%	1	3,00
Inflatable and deployable structures	1	1,4%	1	1,00
Cryogenic and Focal Plane Cooling	1	1,4%	1	1,00
Other	4	5,5%	2	1,75

**Le proposte  
degli  
Stakeholders,  
gli integratori**

ELEMENTI INRICCATI

➤ Automation and Robotics

→ Exploration, landing;

➤ Critical RF technologies & Microelectronics

→ e.g. LNA, HPA; e.g. SAR; e.g. GaN, SOI, InP; Design, Reliability, Characterization, foundries, users;

➤ TT&C Transponders and Payload Data Transmitters

→ Wide T/R bands, High Frequency;

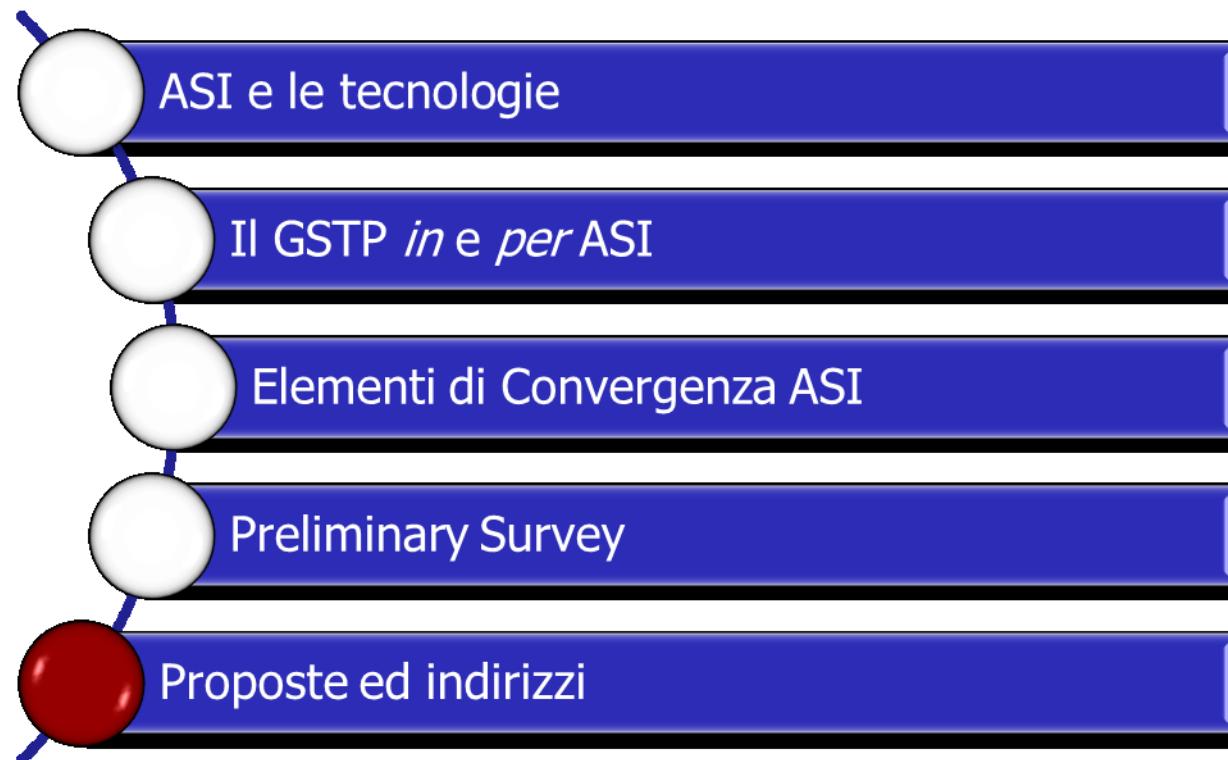
➤ On-Board Payload Data Processing e Computers

→ OBP, OBC, FPGA, PM, DSP...;

➤ Ground Systems SW, Solar Generators Solar, Cells

e AOC (ELEMENTI INTEGRATI (mix))

→ EGS-CC, multiple junction cells, Star Trackers...;



# Ideas and Conclusions

## → Some Considerations

→ Coordination, coordination ..... & coordination

→ "System Approach"

→ Visibility

→ Keep on data gathering

## → "Keep an Eye" on IOT - In Orbit Testing

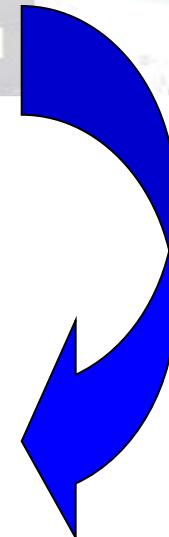
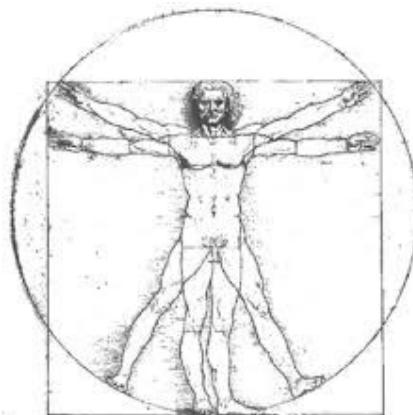
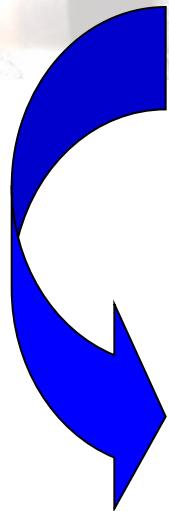
### ESA Survey

→ ESA Business Case Analysis of a Multi-Functional In-Flight Experimental System

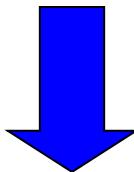
## → Keep it simple and interact with DAC's, Regions, EPR's



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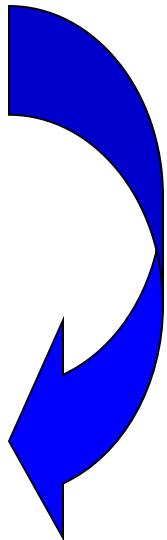
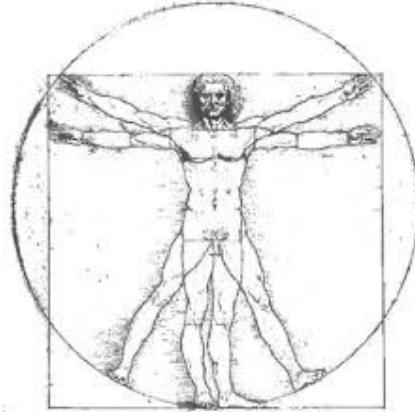
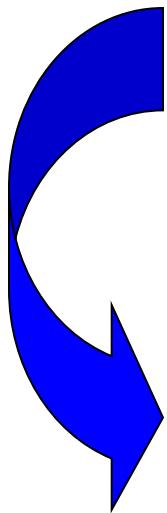


Conoscenza





Benessere



Conoscenza

