



# **Aerospace Science and Technology Department : contributions towards the Brazilian Space Program**

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COPUOS

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# AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT

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## Objective

Introduce Aerospace Science and Technology Department (DCTA) and explain how this organization contributes to achieve objectives of the National Space Program.



# **AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT**

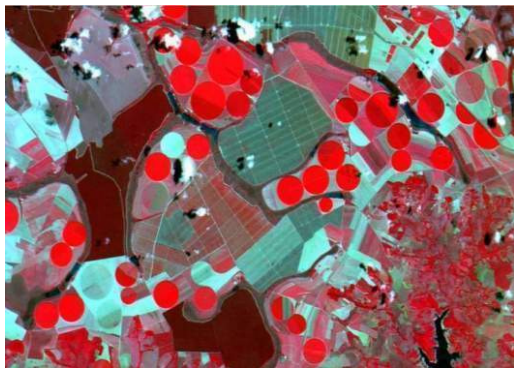
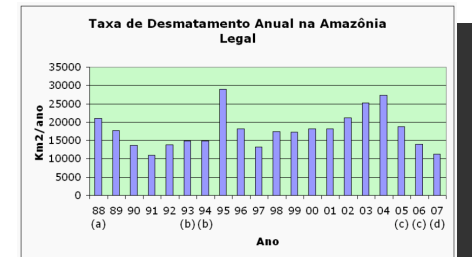
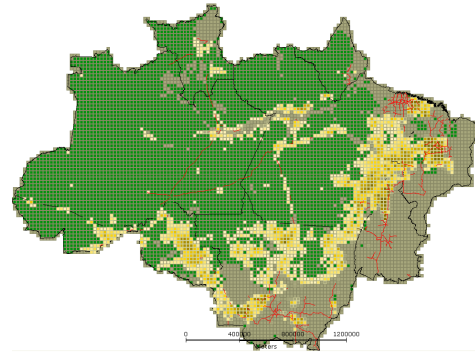
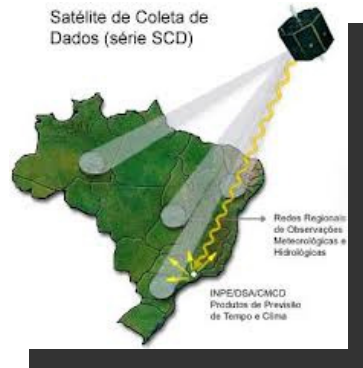
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## **SUMMARY**

- **Brazilian Policy, Program and System for space activities**
  
- **DCTA**
  - **Mission and Organizational Structure**
  - **Space Projects & Activities**
  
- **Final Conclusion**



# USING SPACE TECHNOLOGY TO ADDRESS NATIONAL PROBLEMS





# Brazilian Space Program

## GOALS AND ACTORS

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### **PNDAE (The policy)**

National Politics for the Development of Space Activities:

Establishes objectives and guidelines to be implemented in the national space programs and projects

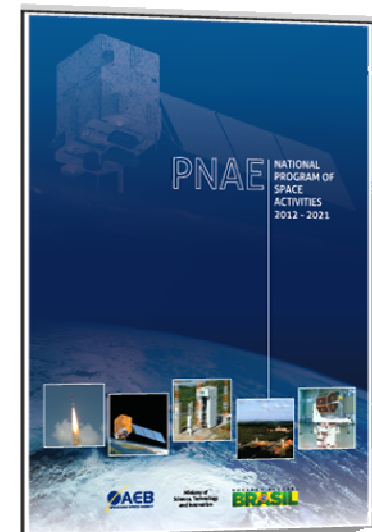
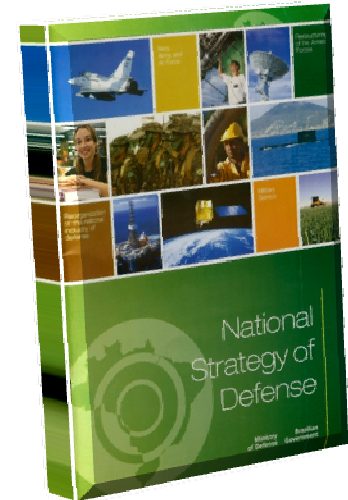
### **PNAE (The Program)**

National Program of Space Activities:

Ten years, revised yearly (2012-2021)

### **SINDAE (The Execution)**

National System for the Development of Space Activities:

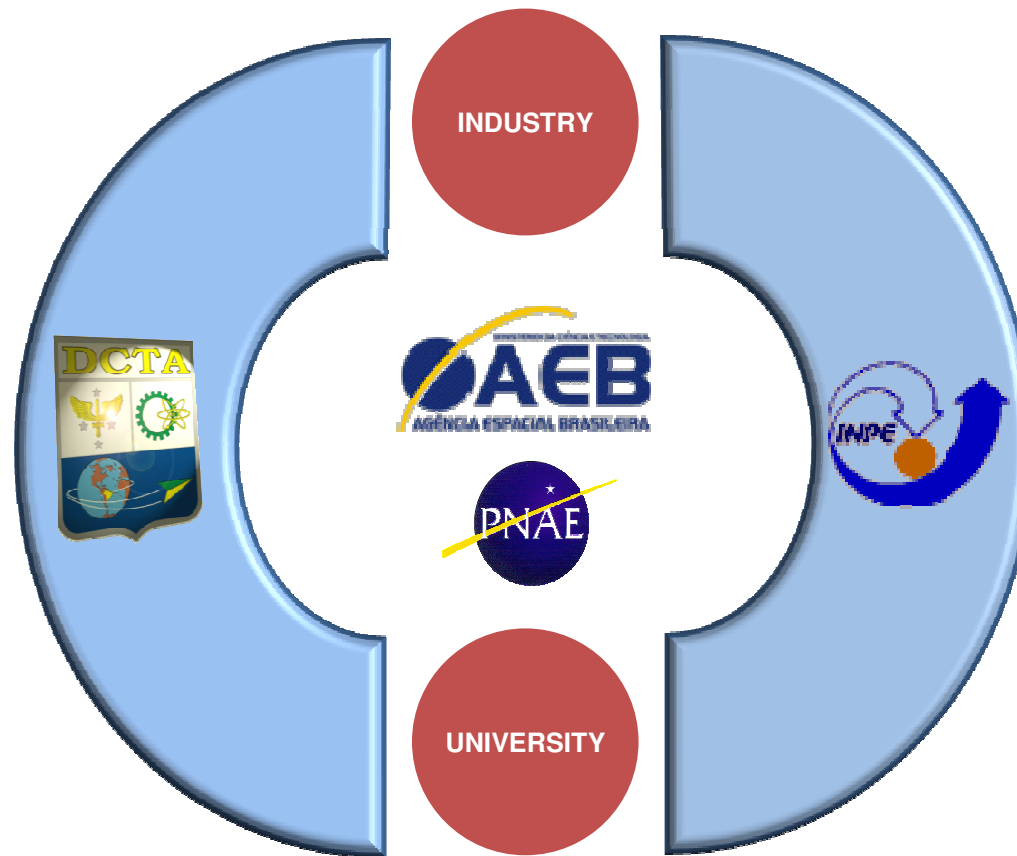




# National System for the Development of Space Activities



Launch Vehicles and  
Launching Centers



Satellites and  
Control Center





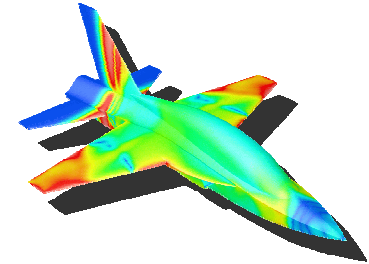
# AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT



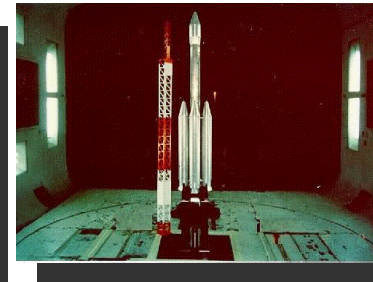
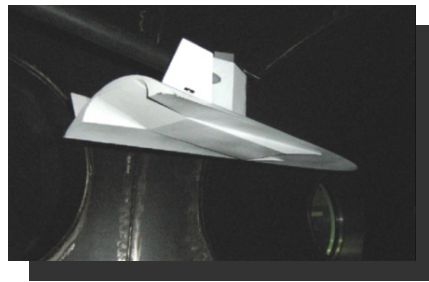


# AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT

## TECHNICAL ACTIVITIES



- Specialized Education
- Technological Research and Development
- Flight Test
- Metrology, Fostering, Industrial Quality, Aerospace Industries Catalog, Certification and Norm, Technology Transfer
- Laboratory tests
- Launch operations





# AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT

## STRUCTURE TO CONDUCT SPACE ACTIVITIES



- Specialized Education
- Research



- Sounding rockets
- Satellite Launch vehicles
- Laboratories and test banches
- Solid Propellant



- Quality, safety, reliability of space products and services



- Launching Centers



# Institute of Aeronautics and Space

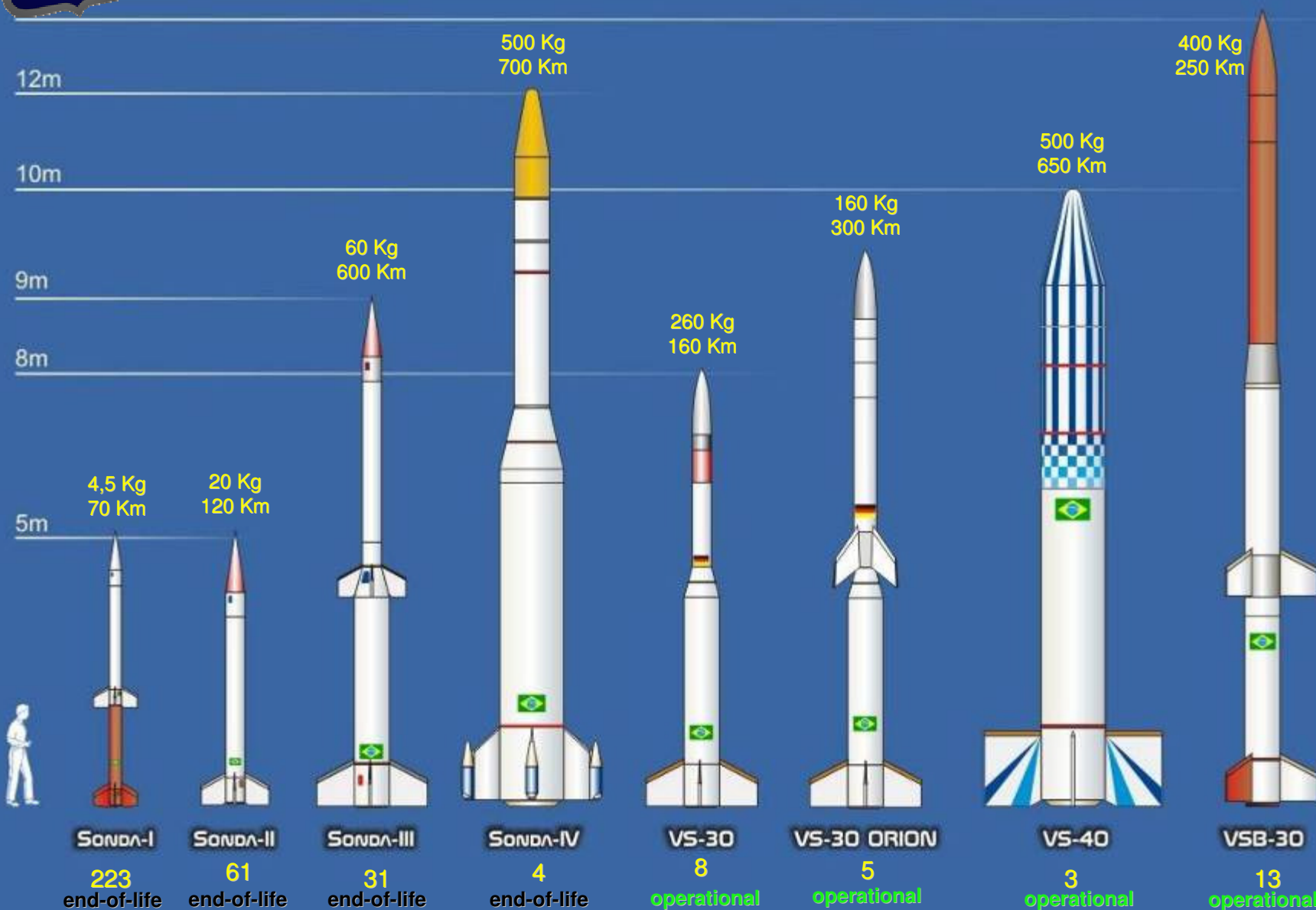
**Access to Space, Infrastructure and Facilities**



- Research
- Development
- Innovation
- Launch Operations
- Technological Services in aeronautical, space and defense systems
- Specialized education



# Access to Space - Sounding Rockets



1965

1967 - 1979

1976 - 1989

(HiFire + INPE)

Shex II

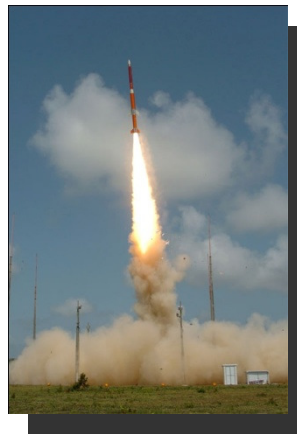
MicroG-2



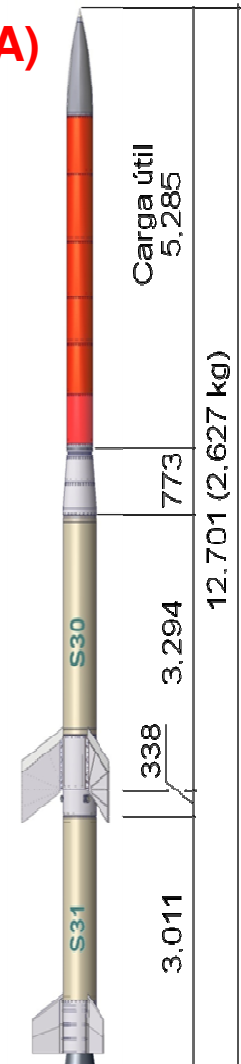
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## Access to Space - Sounding Rockets

- Cooperative development between Germany (DLR) and Brazil (DCTA)
- Payload : 400 kg and Apogee: 250 km
- Conduct scientific and technologic experiments in microgravity



VSB-30



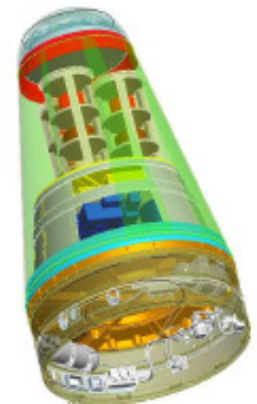


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## Access to Space - Sounding Rockets

### ATMOSPHERIC REENTRY SATELLITE (SARA)

- Orbital platform
- Reentry capability
- for microgravity experiments
- Payload - 300 kg
- LEO - 300 km

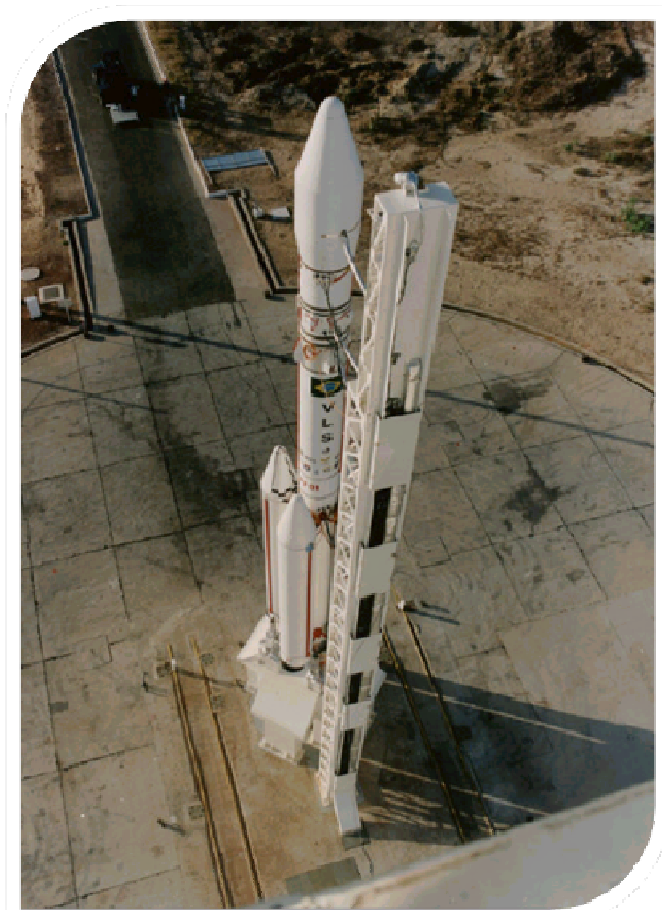




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## Access to Space - Launch Vehicles

### SATELLITE LAUNCH VEHICLE (VLS-1)



- Payload – up to 250 kg
- LEO – up to 700 km





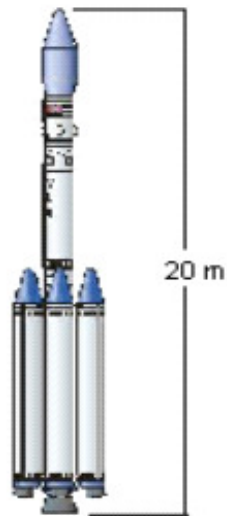
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## Access to Space - Launch Vehicles



### SATELLITE LAUNCH VEHICLE (Next steps)

250 kg  
750 km



VLS-1

2013-2014-2015

500 kg  
750 km



VLS-ALFA

2018

800 kg  
800 km



VLS-BETA

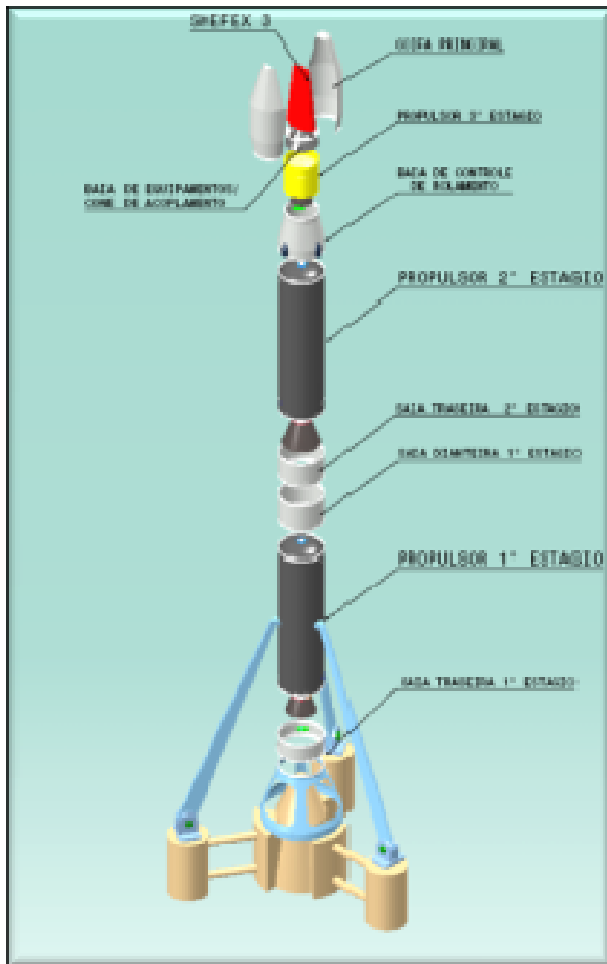
2020



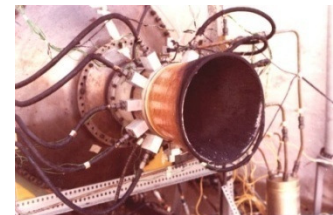
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## Access to Space - Launch Vehicles

### MICROSATELLITE LAUNCH VEHICLE (VLM)



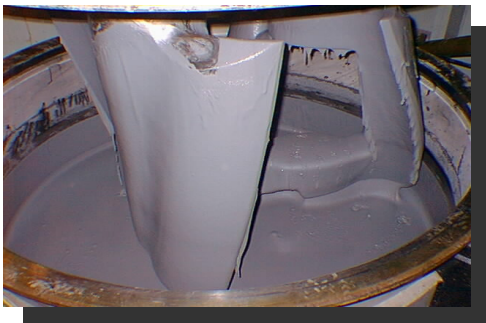
- Solid propellant three-stage rocket
  - Payload – microsattellits up to 150 kg
  - LEO – up to 300 km
- Cooperative development between Germany (DLR) and Brazil (DCTA)





# Institute of Aeronautics and Space

**LABORATORIES, TEST BENCHES, PROPELLANT PLANT**





## Access to Space – Launch Centers

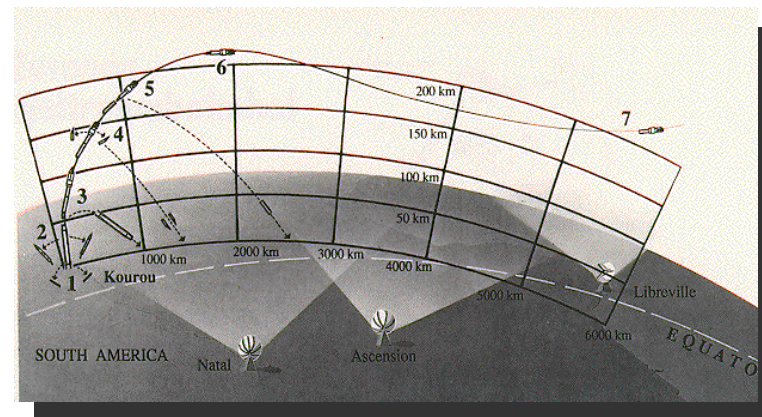




# Barreira do Inferno Launch Center



Radar BEARN



**Brazil - ESA Cooperation**



# Alcantara Launch Center

**Control room**



**Radar**



**Meteorology**



**Telemetry**



**Command & Control Area**





# Alcantara Launch Center

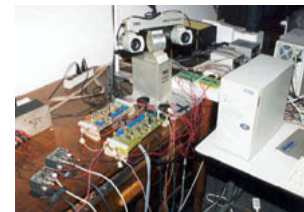
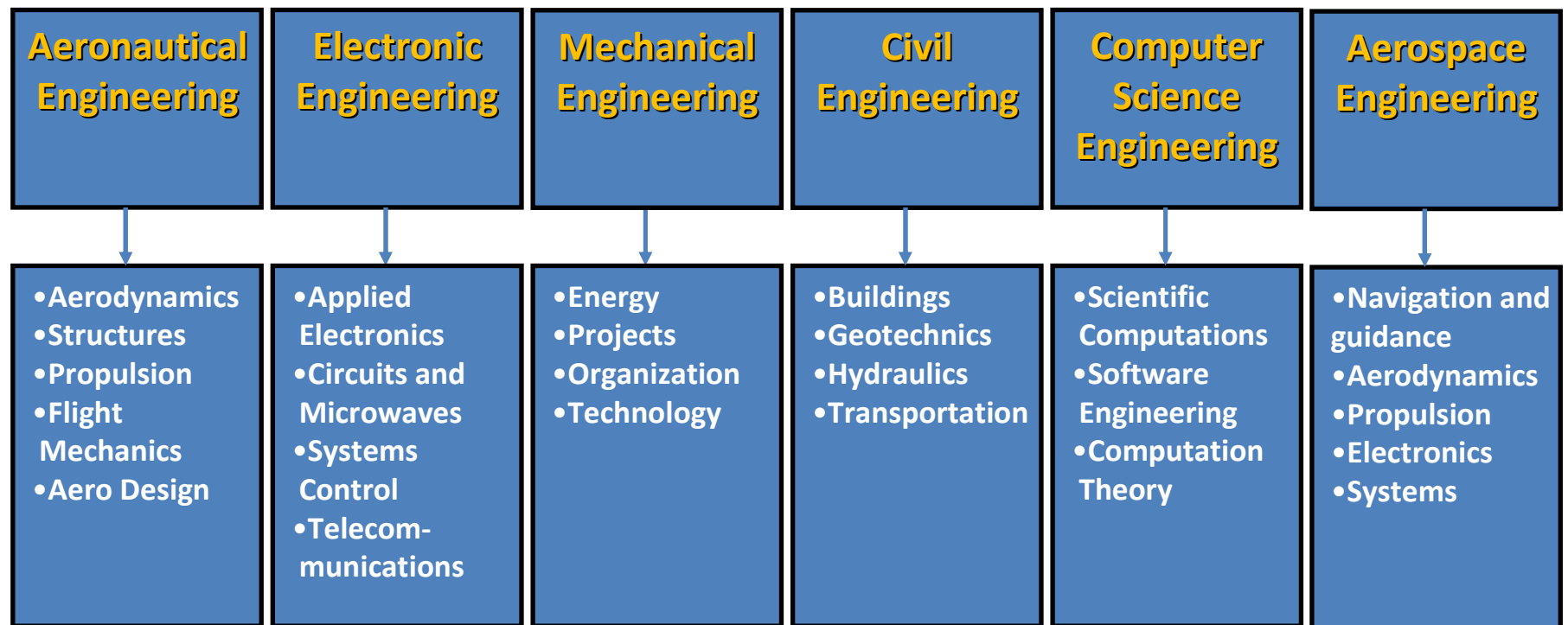




# INSTITUTE OF AERONAUTICAL TECHNOLOGY

## HUMAN RESOURCES PREPARATION

### Graduate Courses





**Institute for Industrial Fostering and Coordination**

**Quality, safety and reliability of space products and services**

**Certification and Qualification of Space  
products, services and goods**

**Metrology**

**Industrial Fostering**

**Technology Transfer**

**Industrial Quality**

**Aerospace Industries Catalog**





# AEROSPACE SCIENCE AND TECHNOLOGY DEPARTMENT

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## CONCLUSIONS

- DCTA plays a fundamental role to achieve the objective of the Brazilian Space Program;
- The development of sounding rockets and launch vehicles has allowed our country to consolidate knowledge and ensure the access to space;
- A large support infrastructure has been deployed, comprised of the CLA, CLBI, Propellant Plan, as well as laboratories and technical niches in private sector.



*Departamento de Ciência e Tecnologia Aeroespacial*

**DCTA**



# **Aerospace Science and Technology Department : contributions towards the Brazilian Space Program**

**Thank You for Your Attention.**

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