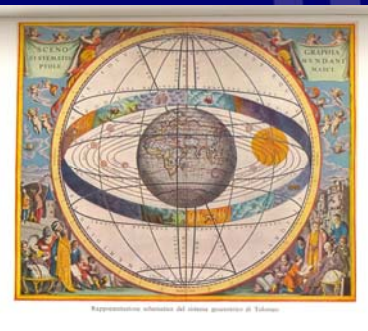


**Cosmic Vision: The Solar System
Priorities
and the synergies with the Exploration
programme
by**

Marcello Coradini

ESTEC 11/04/2007

Scientific Coherence of the Programme



Dynamical Evolution



Origin & Evolution of Atmospheres
+
Influence of the Sun
+
Interaction with Solar Wind

MEX, VEX, Cassini
SOHO CLUSTER ETC



Geochemical & Geological Evolution

Rosetta, BepiColombo



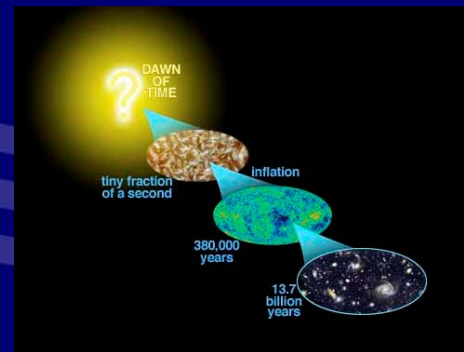
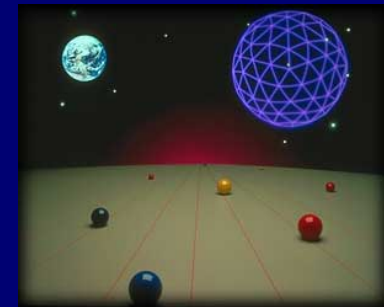
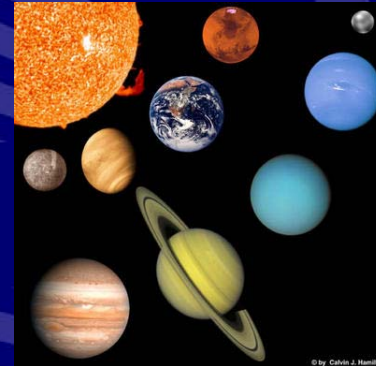
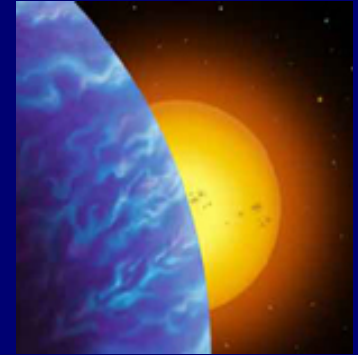
Next Step: Habitability & search for
Past and present lifeforms

ExoMars &...

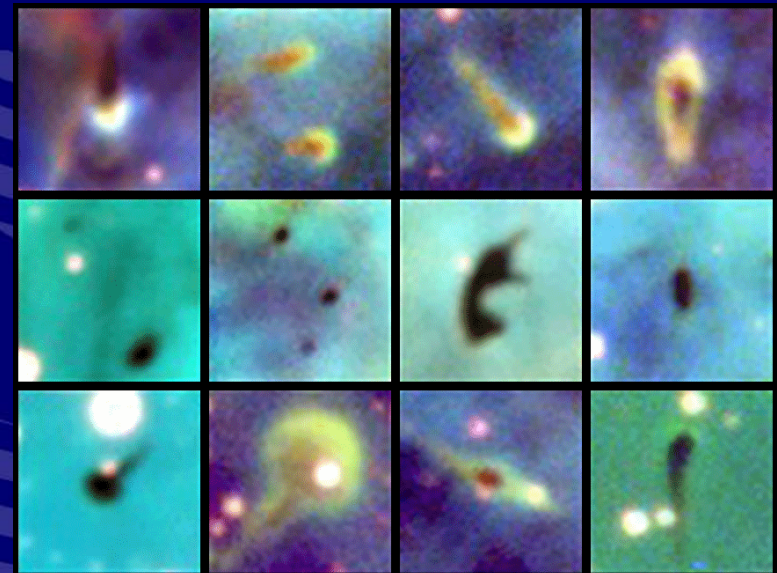
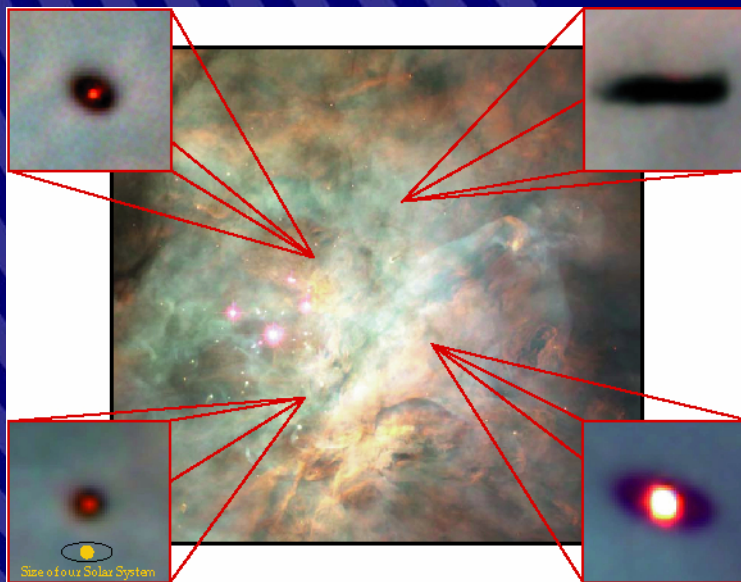


Grand themes

1. What are the conditions for life and planetary formation?
2. How does the Solar System work.
3. What are the fundamental laws of the Universe?
4. How did the Universe originate and what is it made of?

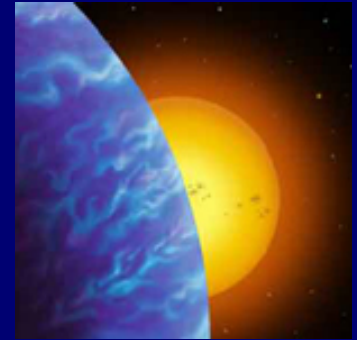


Tracing the origin of the Solar System

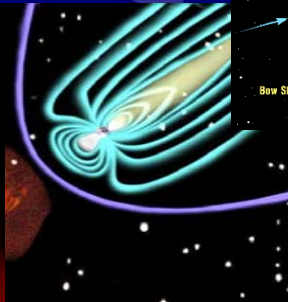
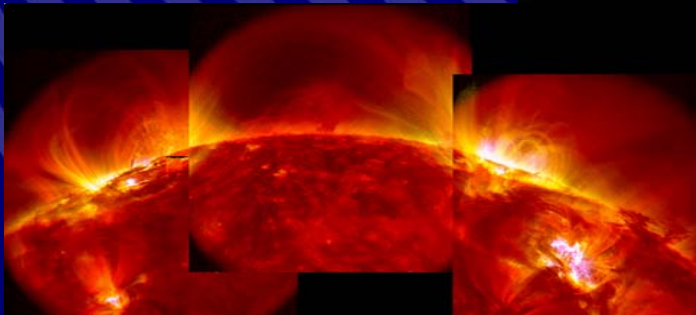
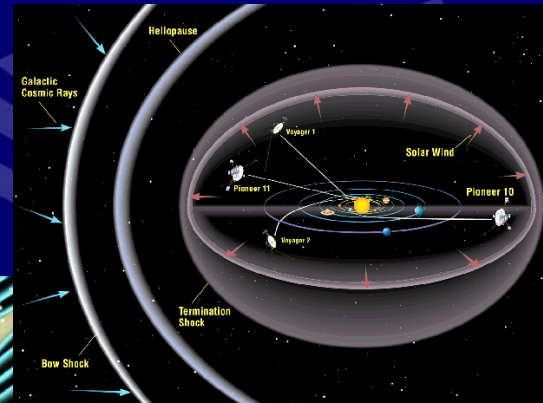


What are the conditions planetary formation?

- From gas and dust to stars and planets.
- The Giant Planet sub-systems.
- The small bodies of the Solar System.
- Extra Solar System formation and comparative study of exo-planets.



The Plasma Universe

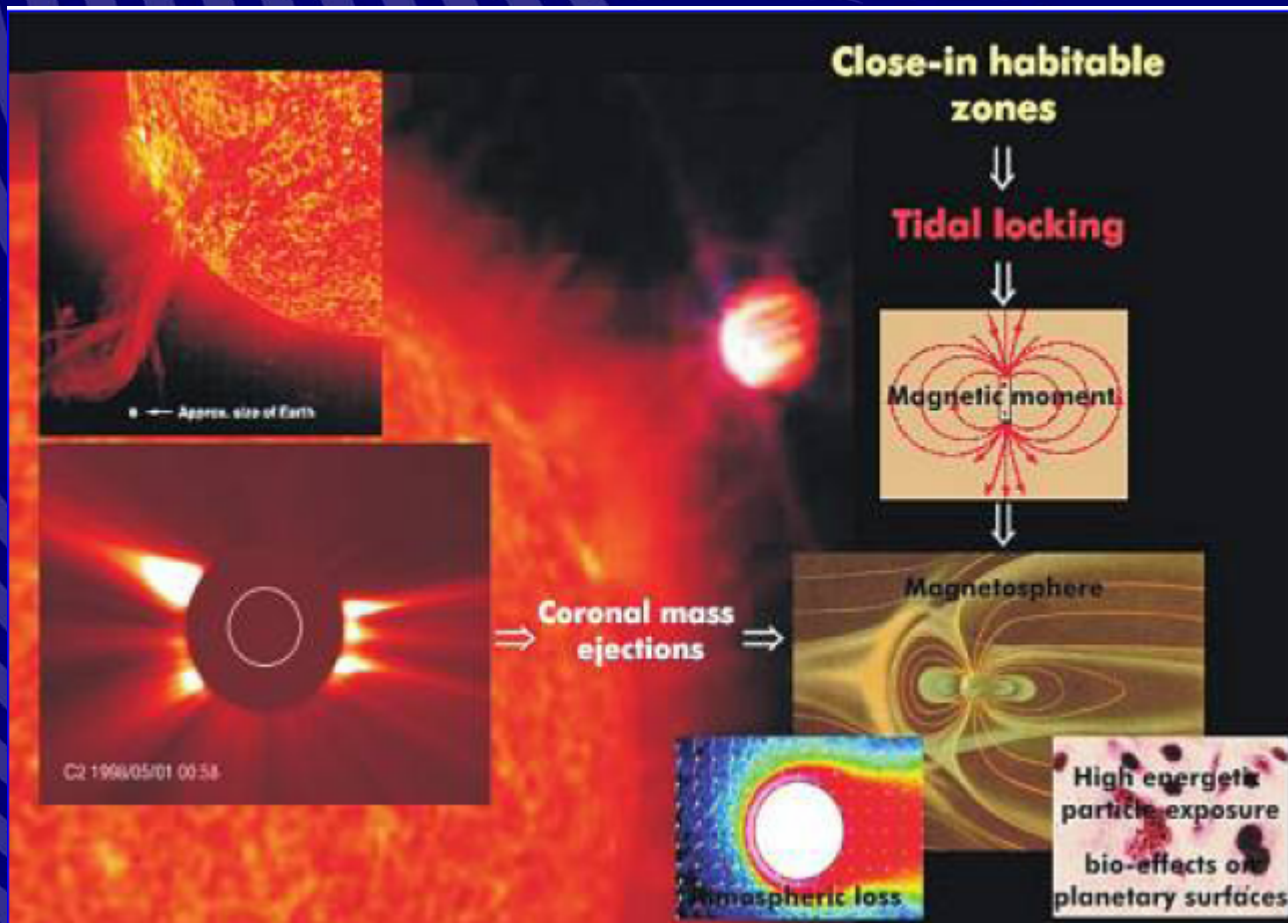


Sun, Earth and Beyond

From Sun to Earth and Beyond: the Plasma Universe

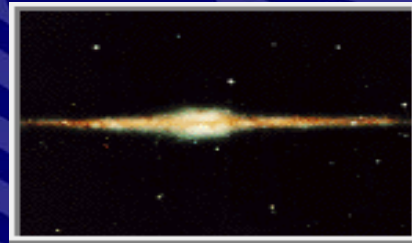
- coupling from electron to interplanetary scales
- solar magnetic fields and solar particle acceleration
- dynamics of non-terrestrial magnetospheres
- heliospheric boundaries and LISM

CME's Plasmas and related bio-impacts



From Lammer 2007

Life and Habitability in the Solar System and beyond



Evolution of Solar System Environments

- Venus in-situ exploration

Traces of life in solar system - look deep below surface ?

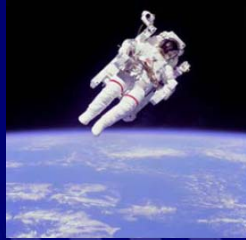
- Europa and the Jupiter system

- Titan

- Mars

- Comparison with extra-solar habitable worlds

European Space Exploration Programme: selected drivers



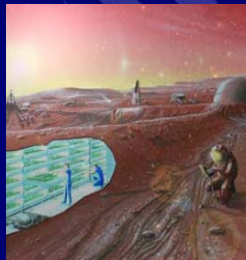
- **Europeans in Space:** assure a European access to enabling technologies, foster the European participation in future space exploration endeavors.



- **History and Fate of Life in the Universe:** understanding the origins and evolution of life on Earth and the search for extraterrestrial life in the Solar System



- **Sustainable Human Life in Space:** the development of enabling technologies to support life and protect health, to access energy, manage environmental risks and exploit local resources



- **Sharing the Space Adventure and Benefits:** communicating the excitement of human space flight and exploration and sharing the resulting benefits, with the general public

ExoMars: next European step to Mars

Preparatory
European Space
Exploration Programme
“Aurora”

European Space Agency





The NEXT Mission

