



ENEA's SPECIFIC INTEREST

New Approach to
Intelligent Console System
for Nuclear Safety

NUCLEAR ENERGY INFRASTRUCTURE RESEARCH

Casaccia Research Center, May 19, 2005

Adam M.Gadomski, Massimo Sepielli

sepielli@casaccia.enea.it

Objective of the initiative

Contribution to the development of an **advanced super-safety console's system** for the control and management nuclear-plants in frame of **large international infrastructure energy networks**.

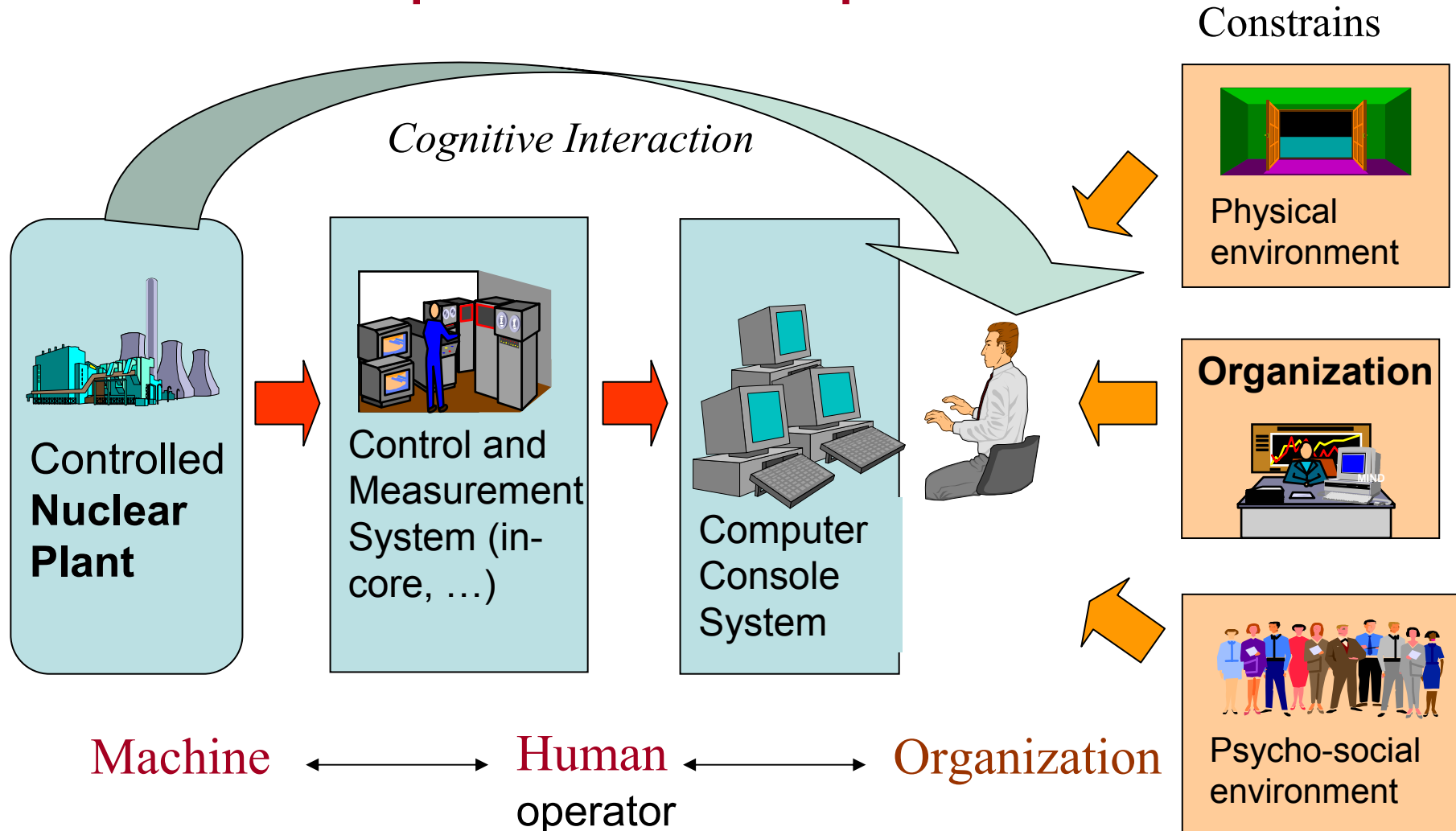
General Scope

Increase safety and economy of nuclear plants control and management in frame of large energetic systems

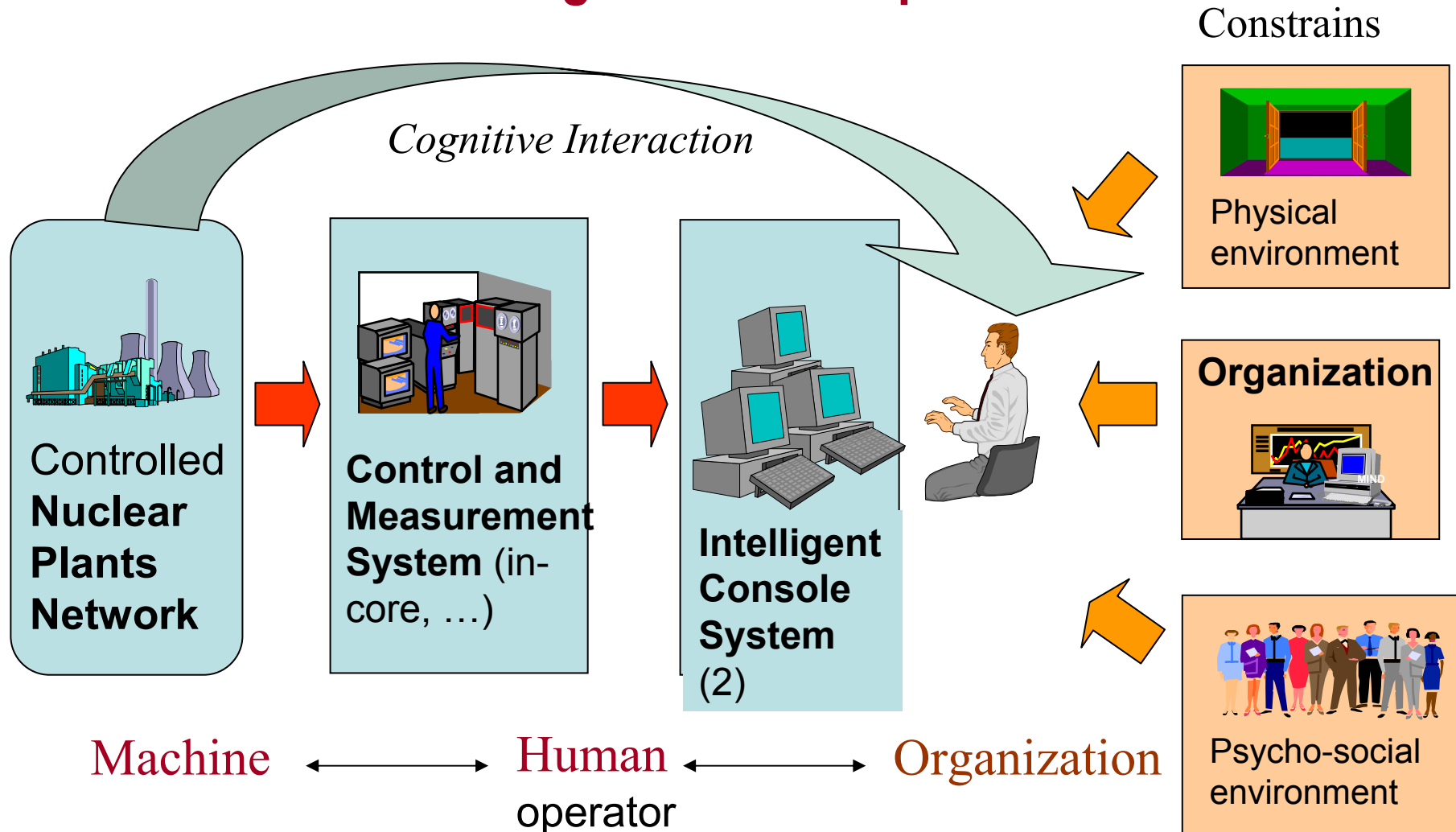
It especially includes : Development of a network of advanced intelligent consoles (NAIC) for real-time decision-support.

Exploitation, supervisory, early-diagnostics, supervision, planning, mitigation and recovery of abnormalities.

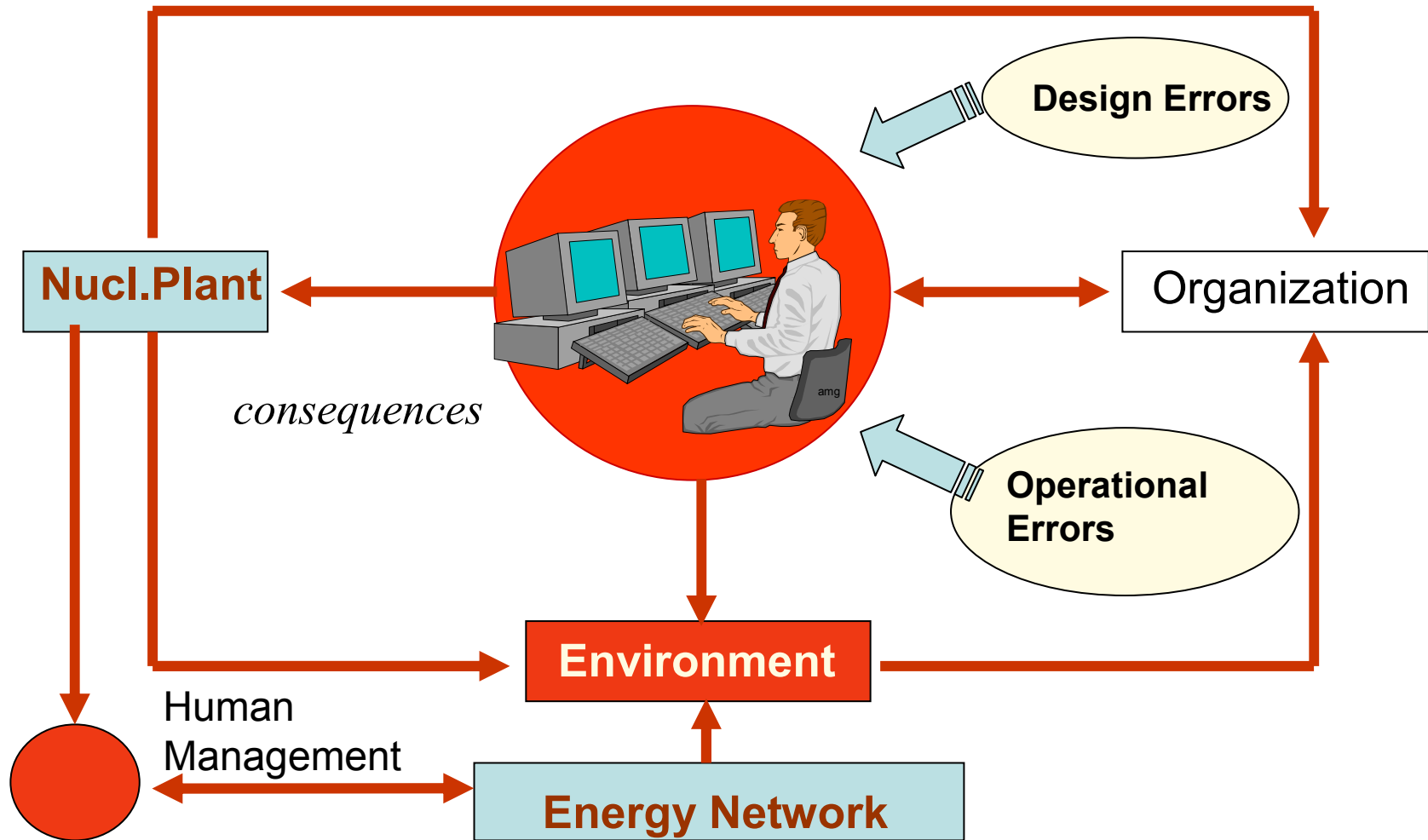
Plant Context : Operator Level Perspective



Network Context : Manager Level Perspective



Propagation of Consequences of Human Errors



Development of a **NASIC**
Network of Advanced Super-safety Intelligent Consoles

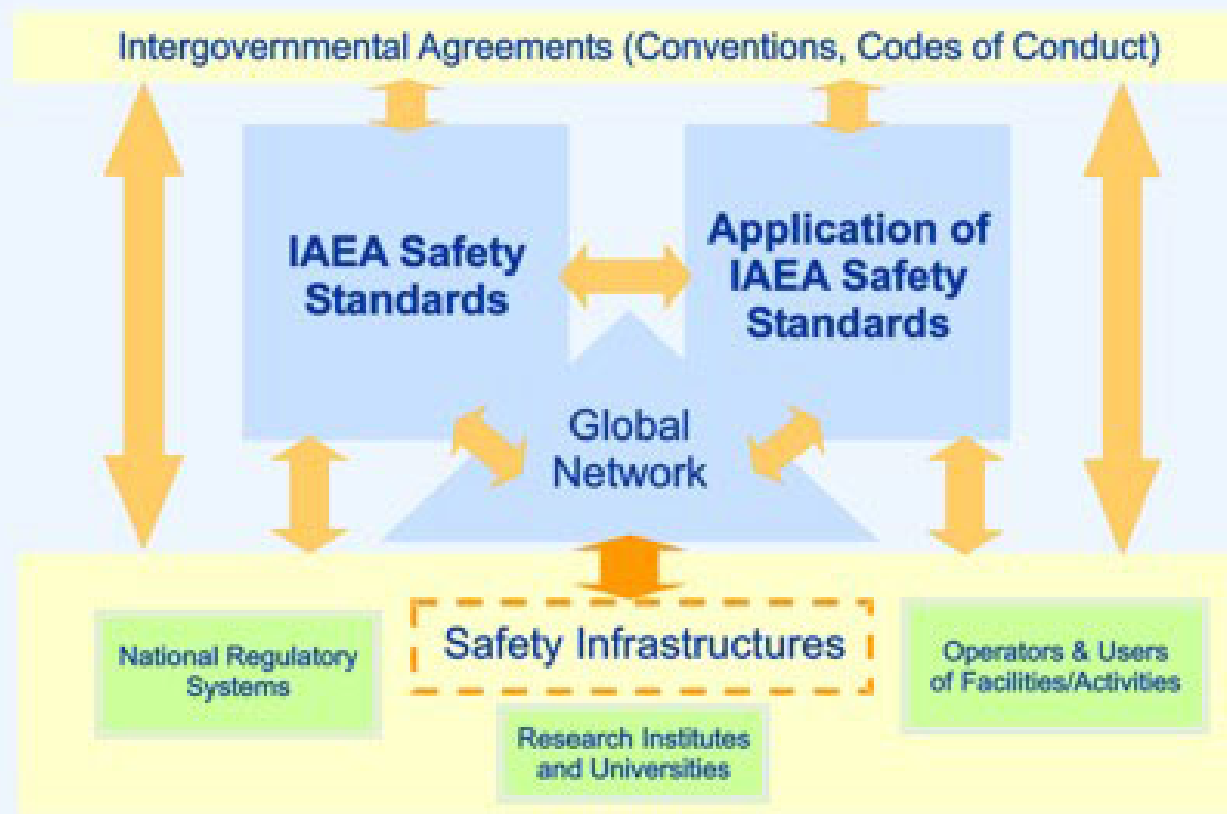
for such long-term task, basic IAEA **Strategic Contexts** are :

- * **Integrated Safety Approach**, (<http://www-ns.iaea.org/coordination/isa.htm>)
- * **Global Safety Regime** (<http://www-ns.iaea.org/coordination/gsa.htm>)

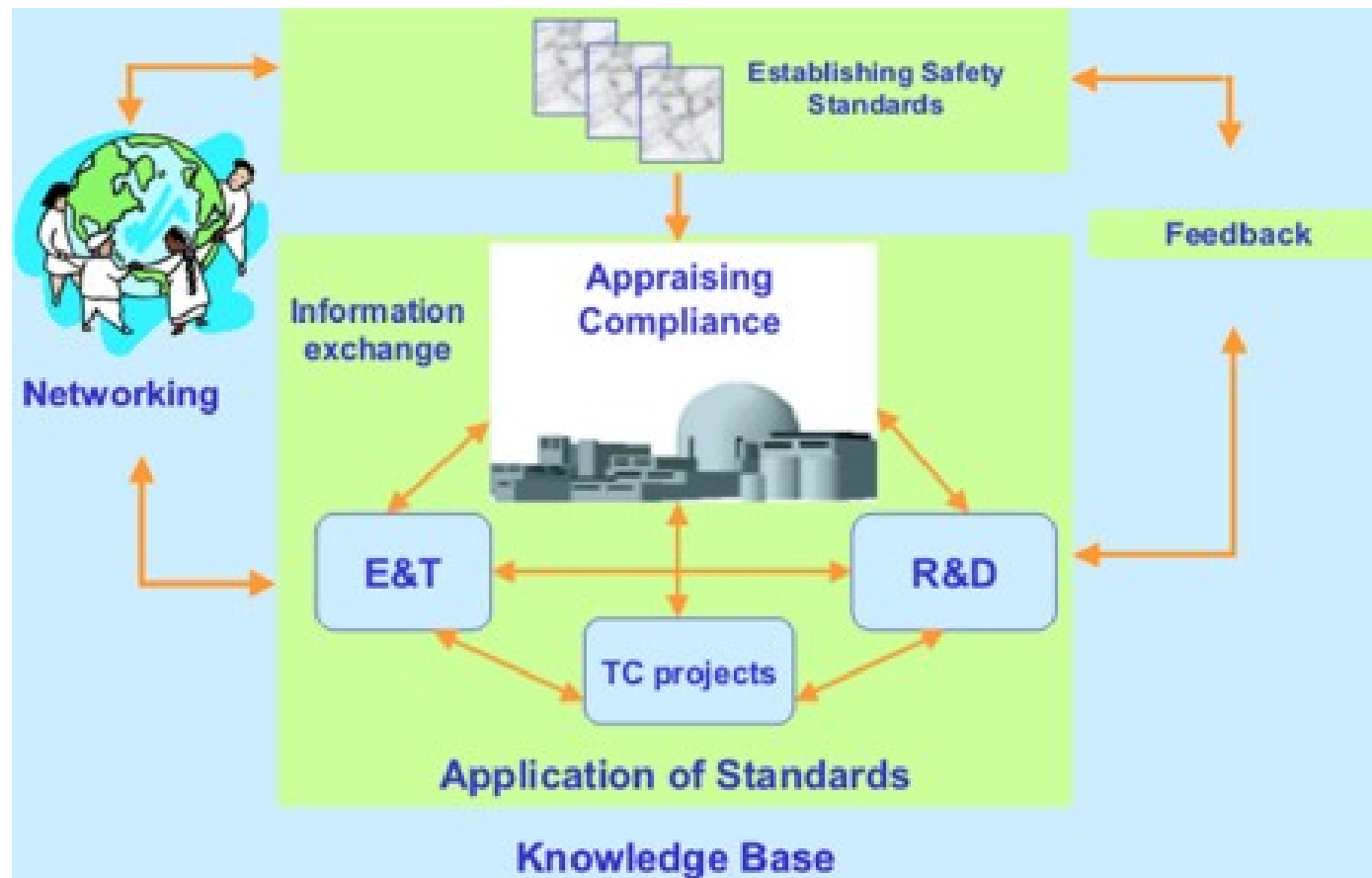
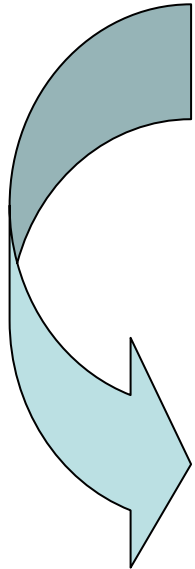
We distinguish two types of consoles with two levels of support: **for operators** and **for managers**.

We may see ENEA's possible contributions to :

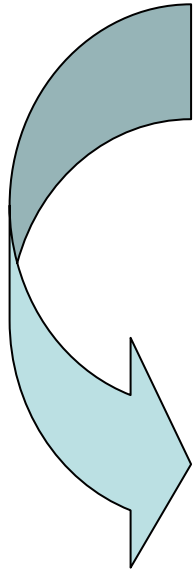
1. the Agency's "Global Safety Regime" vision



2. the integrated management Agency's Integrated Safety Approach



<http://www-ns.iaea.org/coordination/isa.htm>



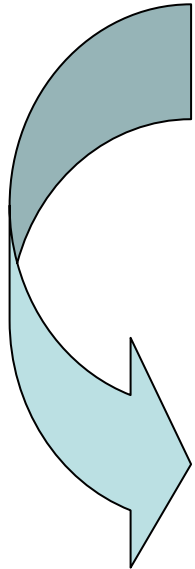
The both are seen from the **perspective** of the **development of NASIC**

Network of Advanced Super-safety Intelligent Consoles

More advanced interdisciplinarity Italian studies of NASIC oriented are in progress and can be the subject of **international debates/negotiations and a research workshop.**

Among others, they refer to:

- Core dynamics control
- Operator tasks and behaviours
- Cognitive operators' errors
- Organization barriers/pathologies
- Robustness of software grids
- Intelligent Decision-support
- Abnormalities and
Emergency Management.



ENEA's current plans & strategy is based on its multiyear (~ 1985) interdisciplinary experiences, among others, in:

- Nuclear Reactor Dynamic field (simulations)
- Decision support systems development
- Emergency and disaster management modelling
- Safety of software and networked systems
- AI technologies and cognitive ergonomics
- Meta-knowledge Engineering Approach

-See: <http://hid.casaccia.enea.it/>