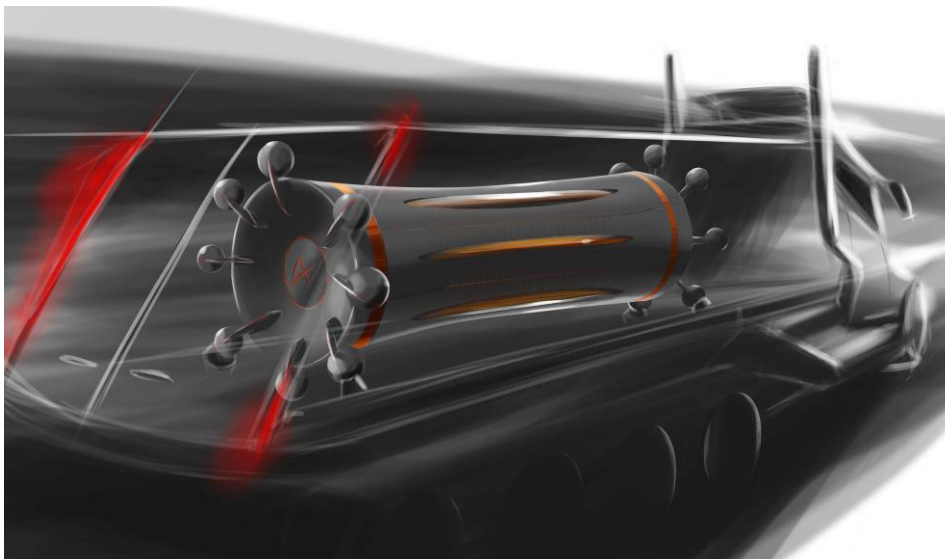




Innovation : Ahead of the Pack(aging)

Michel Hartenstein, Hervé Issard, Céline Fontanet
PATRAM 2010, London, October 7th





Why innovate at all ?

- ▶ **"Innovative" won't work, let's not rock the boat**
 - ◆ **It was so hard getting and renewing an Approval that we don't want to change anything**
 - ◆ **We open new lines of questioning and justifications**

- ▶ **Innovate or die**
 - ◆ **Needs change, markets open**
 - ◆ **Regulations tighten one notch**
 - ◆ **Competent Authorities challenge current designs**
 - ◆ **New technologies make advances possible**
 - ◆ **Preparation for the Renaissance: more shipments, less CO₂, new routes**



Why innovate at all ?

▶ Additional reasons

- ◆ **Customer pressure to do better, faster, cheaper : more payload, higher burn-up, shorter cooling time, fewer shipments, quick approvals, without reducing safety margins**
- ◆ **Ease of operation, limitation of radiation exposure**
- ◆ **Environmental impact and sustainable development**
- ◆ **Increased security requirements**



Strong support from top management essential

Some innovation areas

▶ Equipment design

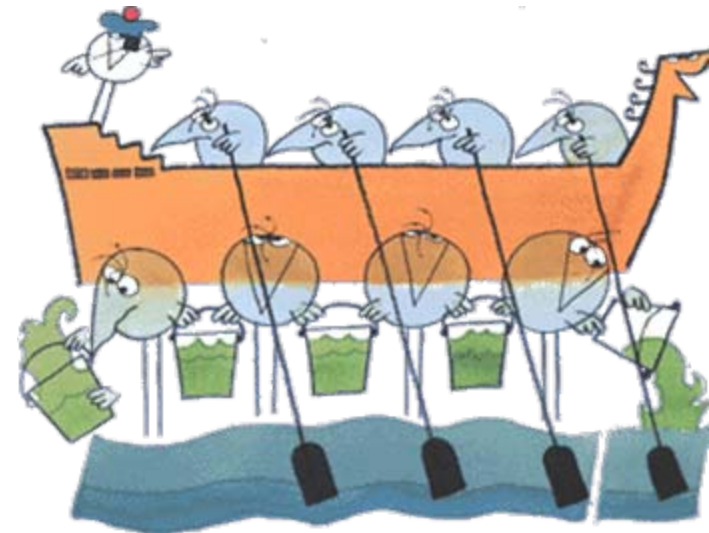
- ◆ High-capacity composite-based baskets
- ◆ Heat dissipation systems through polymer shielding
- ◆ Impact limiters
- ◆ Long-term material behaviour...

▶ Operation

- ◆ Quick loading, remote handling
- ◆ Drying methods
- ◆ Radiolysis and thermolysis control
- ◆ Tie-down...

▶ Logistics

- ◆ Routes, conveyances...



Innovation : the ID school

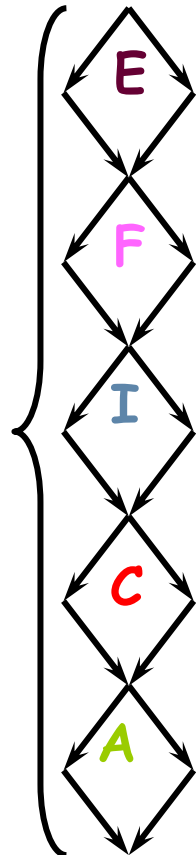
- ▶ **AREVA Logistics BU: a set of innovation tools, the ID school**
 - ◆ **A fun, colourful place with basic modeling tools and workbenches**
 - ◆ **Creativity methods and groups**
 - ◆ **An Intranet idea box**
 - ◆ **A process**



ID school: innovation methods

► Creativity method developed by AREVA : EFICA ®

Each step is the result of a divergent and a convergent phase



EXPLORE (Exploration, Impregnation):

Identify all the aspects of the problem

FORMALIZE (Expression, Analysis, Formulation, Incubation):

Structure and target areas of research

IDEAS (Creation, Ideas, Enrichment, Inspiration) :

Produce a large number of solutions

CONSTRUCTION (Prioritisation, Choice, Valorisation):

Select, combine and enrich ideas

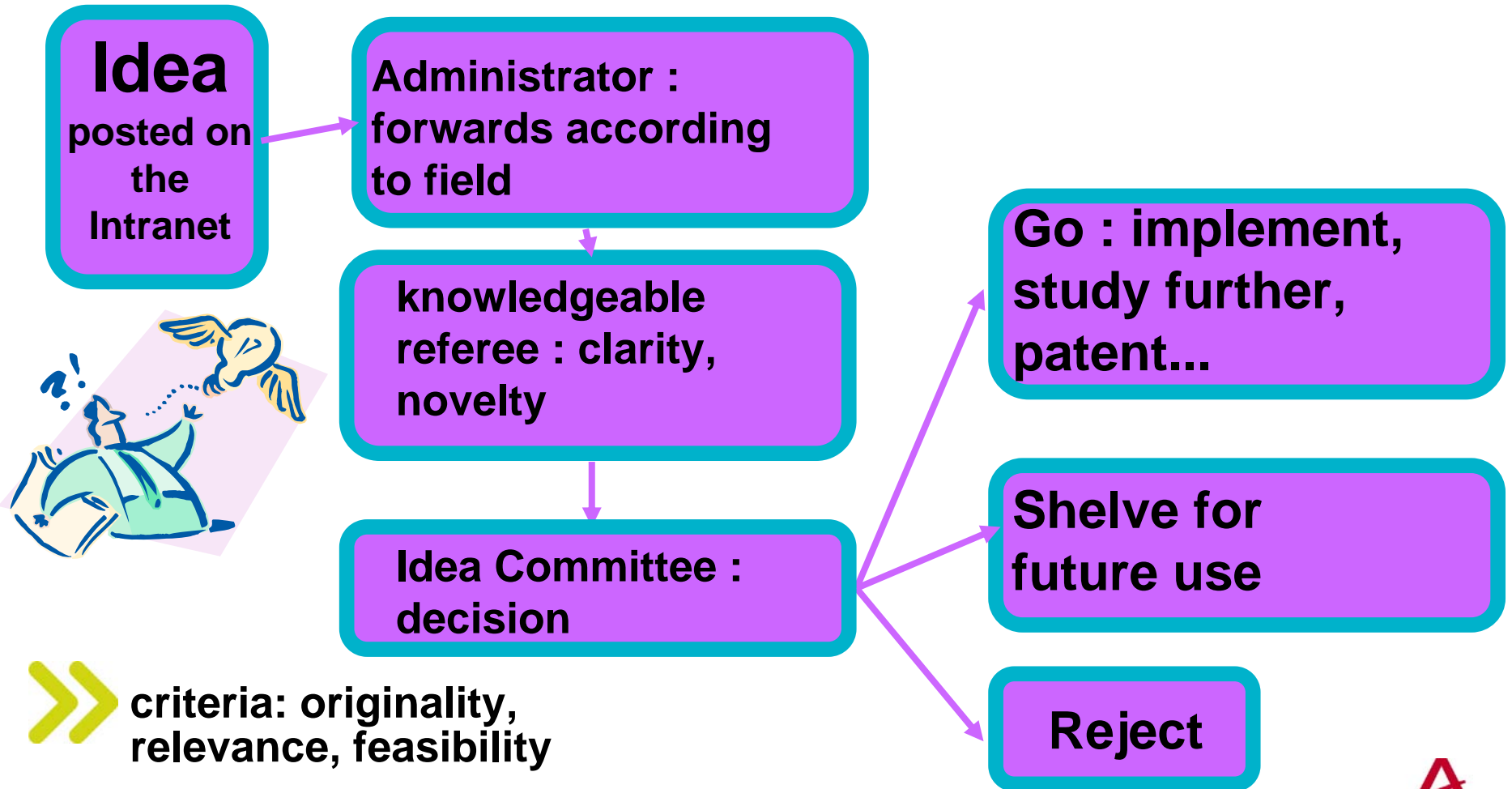
ACTION (Application, Organisation, Action Plan) :

Build an action plan for implementation

► Other methods include brainstorming, Triz, value analysis...

Idea Box : ID hall

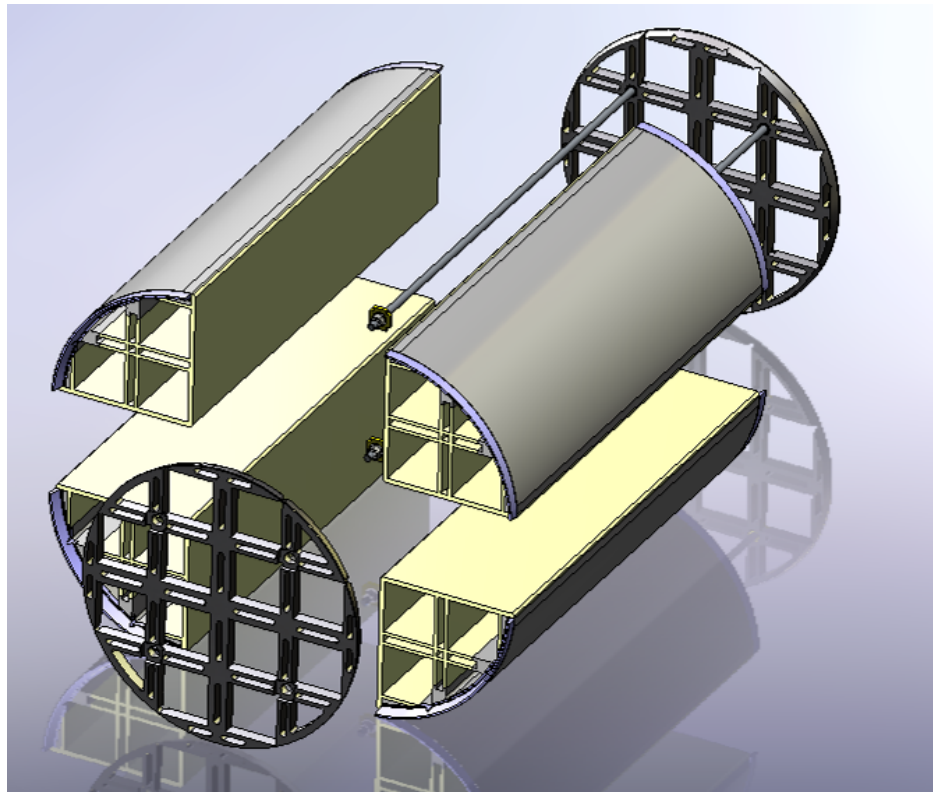
► Tools for managing spontaneous ideas from employees



Example of innovation

► Thermally efficient basket design reduces gaps

- ◆ Dubbed four-quarters (patent pending) . A system pushes the sections from the center against the wall, and retracts them for basket removal.

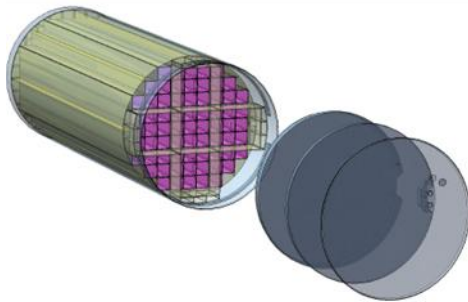


Example of Innovation

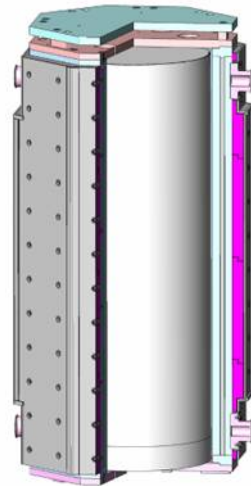
► Used-fuel dry storage systems

◆ TN[®]NOVA

- Canister

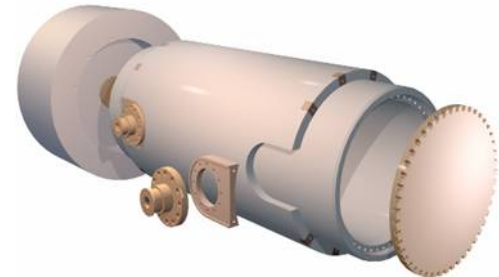


Overpack made of
flat plates



removable
bottom

Transport cask



Conclusi



▶ Innovation process

- ◆ Get ideas from everywhere: client, users, suppliers, staff, Authorities, parent company, other technologies...
- ◆ Select then process them into action plans, including R&D
- ◆ Protect and patent (within reason)
- ◆ Include everyone starting with Top Management
- ◆ Expect to permanently dodge and fight obstacles

▶ Innovation in safe and affordable transport is quite simply what it takes to get the nuclear Renaissance fueled and rolling. Let's make it happen.

▶ Thank you for your kind attention

▶ We are open to visits and benchmarking

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▶ Easy questions welcome !

