Status of the ALFRED Project

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SUMMARY

- ALFRED AND FALCON
- ALFRED CONCEPTUAL DESIGN REVIEW
- ALFRED AND GENERATION IV ACTIVITIES
- ROSATOM COOPERATION AGREEMENT
**Power:** 300 MWth

**Primary cycle:** 400-480 °C

**Secondary cycle:** 335-450 °C
FALCON – a way to organize and find solutions

FALCON consortium has been set-up on December 18th 2013 by: Ansaldo Nucleare, ENEA and RATEN-ICN

Construction Site of ALFRED is Mioveni (ROMANIA) and EU organizations have been invited to join FALCON or a technical cooperation agreement (MoA). FALCON Main activities are:

- **Sharing of information and technical review**  
  Main activity include a technical review of ALFRED

- **Licensing and siting preliminary review**  
  First steps with the Safety Authority

- **Cost estimate and schedule review**  
  Overall project cost and schedule

- **Assessment of financial instruments**  
  Pave the way for infrastructural funds

- **Roadmap and implementation plan**  
  Overall Roadmap and ancillary facilities

- **Promotion initiatives and coordinated actions**  
  Dissemination and coordinated actions
EU Organizations invited to join FALCON through a technical cooperation agreement (MoA). Procedure to sign a FALCON MoA:

- Contact one of the FALCON members
- Agree on a technical activities program
- Sign the MoA with the FALCON member

All contributions are in-kind.

The aim is to constitute a network of organizations interested in the LFR technology development and, as a closer goal, committed to ALFRED construction.

**MoA STATUS:**

- **CRS4** (Sardinia - Italy) **MOA SIGNED**
- **NRG** (Petten, The Netherlands) **MoA final text agreed**
- **SRS** (Rome, Italy) **- MOA SIGNED**
- **IIT** (Milan, Italy) **- activity Agreed – under signature**
- **KIT** (Karlsruhe, Germany) **- activity Agreed – under signature**
- **CIRTEN** (Consortium of Universities, Italy) **- MOA SIGNED**
- **GRS** (TSO, Germany) **- contacts on going**
- **SYMLOG** (Paris, France) **- MOA SIGNED**
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CV-REZ joined FALCON and is now a full member of the consortium.
Two main FALCON initiatives on-going:

- Proposal to Romania structural funds to finance the construction and testing program of several Lead facilities in Mioveni

- Proposal to include in the ESFRI Road map
  - European Strategy Forum on Research Infrastructures
  - a distributed research infrastructure based in:
    - Mioveni - Romania
    - Brasimone - Italy
    - REZ - Czech Republic
  - the proposal presented include ALFRED as one of the main facilities and demonstration activities.
A number of open issues identified in ALFRED design. ACTIVITIES on going to:

- **define a new reactor assembly configuration**
  
  New conceptual design configuration identified → verification

- **Safety vessel and concrete cooling**
  
  New safety vessel (no liner) – New concrete cooling system

- **SG design**
  
  New design developed – CFD analysis done – to be refined

- **Primary pump**
  
  New design developed – very promising – low speed

- **Decay Heat Removal system 2**
  
  Roof position identified - final solution not yet identified - on-going

- **Core design**
  
  Unchanged – one row of dummy FAs added

- **Flow paths in the primary pool**
  
  Main goals to:
  - eliminate thermal stratification
  - eliminate stagnation zones
  - provide coolant to span thw whole vessel
The GIF-LFR provisional System Steering Committee (pSSC) has recently issued with the GIF Reactor Safety Working Group (RSWG) a **White Paper on LFR Safety**. The White Paper is based on ALFRED and has been reviewed by GIF expert group and published on GIF web site by RSWG.

Presently there are two main activities interesting for ALFRED development carried out by LFR – pSSC:

- Development of a Draft for the **“Terms of reference for GIF system safety assessment”** (requested by GIF-RSWG and endorsed by Police and Expert groups)

- **Development of LFR – Safety Design Criteria:**
  LFR - SDC will be developed on the basis of SFR - SDC. A first draft is expect by next spring and will be distributed to ARCADIA project partners.

**Generation IV Technology Road Map Update – 2014**
LEADER – BREST Cooperation Agreement

On May 2014 a Cooperation Agreement (CooA) has been signed between Ansaldo Nucleare, coordinator of LEADER project, and OJSC NIKIET, coordinator of BREST project.

The CooA is based on the exchange of information between the two projects on 7 basic topics:

**Topic 1. Conceptual design** of LFRs at various power sizes

**Topic 2. Nuclear Safety:** Approaches and methods

**Topic 3.** Comp. and exp. studies of neutron and physical characteristics

**Topic 4.** Computer and exp. study of thermal and hydraulic characteristics of elements of the active core, steam generator and circulating flow pattern in the reactor

**Topic 5. Investigation on available materials compatible with lead coolant and possible approaches for corrosion reduction**

**Topic 6: long term behavior of NFC** (advantages and env. Impact)

**Topic 7:** Education and training

Provide a framework to grow the skills of the young engineers and scientist on LFR technology as well as scientific aspects.

The CooA activities consist of a number of meetings dedicated to information exchange among experts.

**First meeting will take place in May 2015 - Genova – JRC invited to join the discussion**
Thank you for your attention.