Nio Robotics presents ARU

“**Inspection** & Industrial **Maintenance** Robot for Nuclear applications"

ARU by Nio Robotics

Nio Robotics :

A vision to revolutionize field robotics

The founders

Mathis Le Marec
Vision Team Lead

Titouan Le Marec
CEO

Bertrand Le Marec
Biz. Dev.

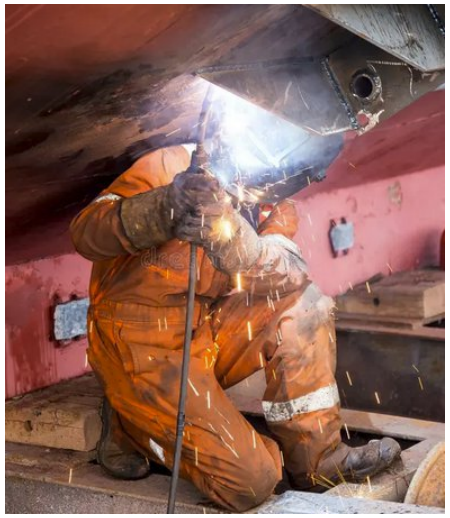
The company

- Founded in January 2021, located in Toulouse
- 37 people, including 10 PHDs and 20 engineers in the fields of Mechatronics, Locomotion, Perception, Software, Industrialisation
- Continuous Workforce growth in 2025

The goal :
Building a useful and capable robot for the most complex environments and jobs.

Automating hard-work

Where compromising on agility is impossible



It is good to have a robot
going where it is difficult for humans to go

Drones :
“Inspection without action is frustrati
and limiting.”

Quadruped :
“Limited to structured space.”
“Adding an arm removes 70% of the payload space and increase height.”

Humanoids :

Rigid central body : *“If your head fit, the rest does”* but not for robot…

Limited shapeshifting abilities.

Biomimetics has limits.

Multiplying robots :
Mission specific robots are not cost efficient and ROI is difficult to reach

A new concept :

Polymorphism for a multi-purpose field operator

The most powerful embedded AI will always be limited by the abilities of its “physical body”.

By getting rid of the central body humanoid are build around, Aru can fully shapeshift to operate in place that rigid humanoid robot can never reach.

Aru is just the robot for where hard work is required.

Snake mode
To go off the structured path

Rover
Efficiency & Speed

Quadruped
For advanced agility

Tripped
To act like a humanoid robot

Protected by an extensive international patent on the concept itself.

Nio Robotics & Aru:

A vision to revolutionize field robotics

Safe by design

Aru remains stable in unstructured environments.

Polymorphic

Aru shapeshift to adjust to the environment

Interacts

Aru opens to deploy one of its arm to act on the world with its payload

Sober

Aru is made for efficient motions, using wheels when possible, for increased mission durations

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A robot ready for its first missions:

Specializations to industrial missions

Industrial Inspection : periodic autonomous inspection and direct intervention.

- Leak detection, hot points, misplaced objects, etc…
- Gauge reading and manipulations of equipments, valves, etc…
- Autonomous radiation monitoring and wall smearing before and after human interventions.

Goal : limit and prevent stoppage and downtime costing easily 100k$ per hours.

Field Operator on steel structure : Using tools to produce, maintain and control those infrastructures.

- Surface preparation and painting of steel structure for rust protection.
- Laser stripping of rust, lead, asbestos coatings.
- Soldering for assembly and reparation.

Goal : automate costly, dangerous tasks and disrupt industrial process by removing danger from the equation.

EDF – NAVAL GROUP

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Robotics going to nuclear market

How robotics would contribute the performance of NPPs

Why robotics in NPP?

- because we can increase performance in running NPP
- because we need to increase lifetime & efficiency of NPP
- because humans cannot work all the time in NPP on every mission with 100% efficiency
- because we can increase human security & NPP safety
- because in some cases a human cannot realise his mission safely or it requires to slow down the operation of NPP
- because etc.…

“Robolution : transforming nuclear safety & efficiency”

=> how to meet customer needs for nuclear applications?

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Challenge: Aru going to energy market

Definition of use case **with** industrial partners

- AI-assisted visual inspection of the RIC during the restart of the nuclear reactor
- Doubt clearance and preliminary diagnostic in an operating nuclear reactor
- Nuclear site inspections conducted during planned maintenance outages
- Assistant for physical and radiological diagnostics in nuclear fuel cycle facilities.
- Inspection and Intervention for nuclear site decommissioning
- Inspection of offshore infrastructures

Industrial partners

EDF, orano, framatome, ONET, TEN TECHNIP ENERGIES, EQUANS

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Challenge: Aru in Nuclear Power Plants

Project supported by the french government

+

FRANCE 2030

+

bpifrance

Development: Specializing the robot for energy sector

Radioactive

Design a robot resistant to radiation, suited for use in contaminated environments, to operate in radioactive zones, able to be decontaminated
Associated qualification

Predictive maintenance & Degraded Mode

Safety, operational reliability and resilience of Aru in case of hardware or behavioral failures

Radio mesh

Robust wireless secure communication solution in constrained environments.

ATEX

Explosive atmosphere ATEX Zone 1 IIB & IP67
Hardware developments for Aru ATEX and associated qualification.

Aru in Nuclear Power Plants

Timeline

Aru Early Adopter

Robot d'excellence, France 2030

- **Aru One**
- **Aru Energy** (ATEX & RAD)

2025

First use cases of ARU as mature prototype (TRL 7)

2026

Industrialisation & Standardisation of ARU ONE

2027

Specialization for energy sectors:

- dismantlement of NPPs
- inspection & intervention in NPPs (RADiation hardened)
- inspection & intervention in Oil & Gas
- Pre-qualification

2028

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Challenge: Strengthen links with nuclear industries

The reason for the Early Adopter Program

What Early adopters bring

- Roboticians meet non-roboticians: an opportunity to understand each other
- Smooth adoption of the robot in the working environment
- Fast matchmaking between needs in the nuclear power plants and the supplier industry.
- Best return of experience is on the field
- Real-time information integration in operational systems & open API
- Clear defined assessed use cases adapted to the required needs
- Exchange with regulators & improve international standards => going towards the qualification
- And of course financial support to go forward

EDF

With the technical partners

- Integrators who know the nuclear market
- Nuclear Instruments providers

ONET framatome TEN TECHNIP ENERGIES

Next events

Looking for Partners and Early Adopters

Early adopter program

- With iteration 3.3 of the Aru platform, Aru has reached Early Adopter Platform (DVT) level of maturity (IP67 ; Can be cleaned easily ; Fast maintenance thanks to modulare elements, Control user interface)

- **We are looking for lab, industrial actors, end users… who are eager to invest in Aru and its disruptive robotic architecture to test it in the nuclear field.**

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at

Come and visit us at WNE, 04-06 November, parc des expositions, hall 6 Villepinte

5 Nov. 15:30, pitch at framatome booth, with framatome :

“Why and how robotics standardization would contribute the performance of NPP ?”

Thank you for your attention !

Nio

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