

CNIM Air Space (formerly Airstar Aerospace) - Diridrone

Peter Lobner, 11 February 2022

1. Introduction

On 22 March 2019, Airstar Aerospace was acquired by CNIM Group and was rebranded as CNIM Air Space. The rebranded firm is a



subsidiary affiliated with CNIM Group's Innovation and Systems business sector. CNIM Air Space manufactures tethered aerostats, stratospheric balloons, airships and thermal protection for satellites. They

are a team member on the Stratobus stratospheric airship project led by Thales Alenia Space. The CNIM Air Space website is here:

<https://cnim-air-space.com/en/>

2. Diridrone

Under a research and development (R&D) partnership initiated in 2017 with the French electricity transmission system operator RTE (Le Réseau de Transport d'Electricité), CNIM Air Space has developed an electrically-powered drone airship demonstrator that is designed to perform persistent surveillance and infrastructure inspection tasks, such as:

- Linear inspections: railways, power lines, pipelines, highways, waterways, etc.
- Area inspection: agriculture, forestry, aquaculture, engineered structures, etc.
- Sensitive & industrial site surveillance (patrols)
- Pollution detection in a maritime zone
- Surveillance of large events

RTE plans to use the drone, named Diridrone, for inspecting its network of high-voltage electric transmission lines.



*Diridrone, rear quarter view.
Source: Screenshot from RTE video (Dec 2020)*



*The two main electric motor-driven propellers are attached to the non-rigid envelope with straps and cables secured to reinforced areas of the envelope.
Source: Screenshot from RTE video (Dec 2020)*



The vertical and horizontal fins have moving aerodynamic control surfaces. A small propeller attached at the tail with straps and cables provides lateral thrust to improve low-speed handling.

Source: CNIM Air Space

The drone airship demonstrator has an overall length of 14.5 meters (47.6 ft), a maximum width of 4.5 meters (15.1 ft), and a total mass of 150 kg (331 lb).

It has a low operating cost, a low logistics footprint and is designed for vertical takeoff and landing operations from a small area with a small ground crew. In flight, it can operate over a wide speed range, including stationary flight, and carry a 10 kg (22 lb) payload on long distance flights. The mission programming system enables flights to be conducted autonomously by the autopilot or piloted manually by remote control.

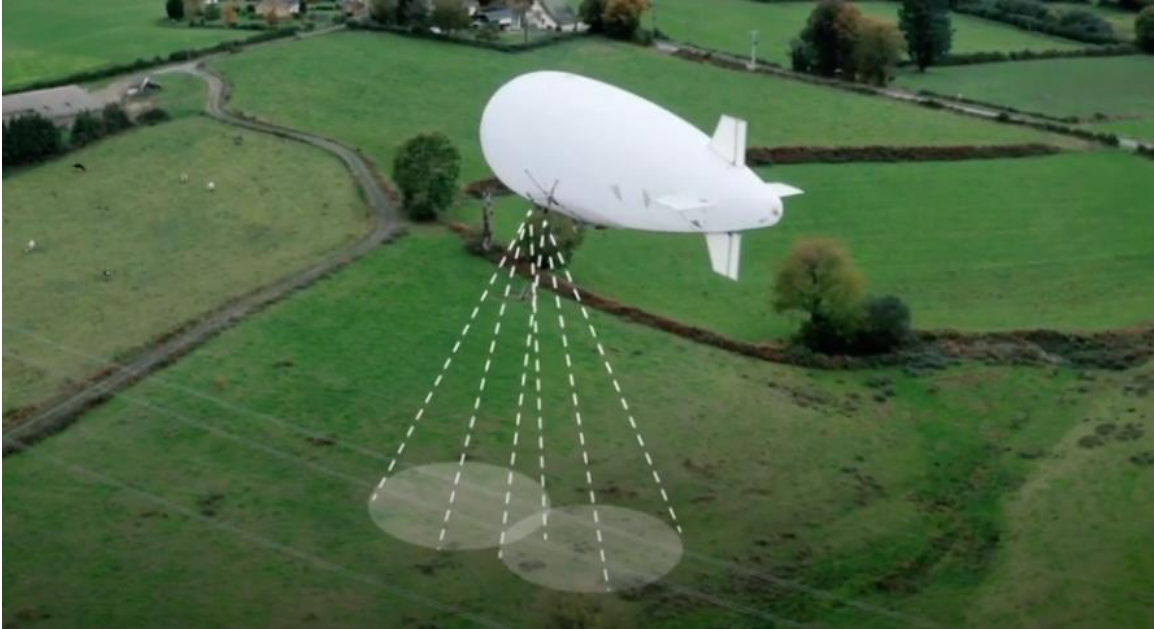
In October 2020, the Diridrone successfully completed its first power line inspection missions to monitor the condition of power lines using onboard sensors under the gas envelope. This new tool allows RTE to inspect power lines with precision, without de-energizing the lines and causing temporary power outages. The collected information is an input to RTE's maintenance planning process for its entire power line network.



*Diridrone being prepared in the field for flight.
Source: CNIM Air Space*



*Diridrone flying over an RTE switchyard.
Source: Screenshot from RTE video (Dec 2020)*



Representation of Diridrone conducting a power line inspection.



Diridrone in flight.

Source, both graphics: Screenshot from RTE video (Dec 2020)

3. For more information

- "Airstar Aerospace presentation 2019" (1 :23 minutes), CNIM Air Space, 10 June 2019:
https://www.youtube.com/watch?v=PKOqrnQUo_g

- “Diridrone: the lighter-than-air drone” (2:06 minutes), CNIM Air Space, 5 November 2020:
<https://www.youtube.com/watch?v=MKZRdAIr0yM&t=3s>
- “World premier: a drone airship for the automatic inspection of power lines” (“Première mondiale: un dirigeable drone au service de l’inspection automatique des lignes électriques”) (4:20 minutes), RTE, 17 December 2020:
<https://www.youtube.com/watch?v=IKTgDpPefjM&list=PLcnWp7EVKyvEREcmNAVigm1CjDQGDC65C&t=78s>

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- *Modern Airships - Part 1*: <https://lynceans.org/all-posts/modern-airships-part-1/>
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 - Airstar Aerospace - small manned & unmanned airships
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