

## **METHODOLOGY FOR THE OPTIMIZATION OF THE FLY-AWAY MANEUVER IN CASE OF ENGINE FAILURE DURING HOGE OPERATIONS**

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### **ABSTRACT**

This paper presents the methodology followed to set up and execute a safe and efficient flight test programme to optimize the Fly-Away maneuver technique. The activity has been performed in order to obtain a minimum helicopter height loss after an engine failure starting from helicopter in Hovering-Out-of-Ground-Effect (HOGE) operations.

The flight tests were performed after development of a suitable mathematical model of the NH90 Naval helicopter that was validated by data gathered during a dedicated flight test campaign.

The activities performed to obtain the validation of the mathematical model and also to assess and verify the maneuver feasibility are reported below:

1. Mathematical model:
  - a. Development of the Naval NH90 helicopter model by a dedicated flight dynamic code widely used in the Helicopter System Design (HSD) – Flight Mechanics Department of the AgustaWestland company.
2. Validation of the mathematical model:
  - a. Flight test campaign dedicated to data acquisition suitable for the validation of the model in steady-state condition.
  - b. Fly-Away maneuver performed with the “standard” technique to gather data for the validation of the mathematical model in very dynamic condition.
  - c. Validation of the mathematical model in dynamic condition.
3. Simulation of the Fly-Away by the validated mathematical model in order to identify the influencing parameters to optimize the maneuver and to minimize the helicopter height loss.
4. Flight test activities:
  - a. Fly-Away maneuver performed in accordance with the prediction of the model.
  - b. Verification of correctness of the influencing parameters identified by the model.
  - c. Assessment of the maneuver and its feasibility also taking into account the average pilot skill.
5. Extrapolation of the Fly-Away maneuver against the contractual requirements in terms of helicopter weight, delay-time after engine failure, minimum jettisonable weight.

The activity was carried out with the NH90-HITN01 Helicopter, the first production Italian Navy Helicopter in the NFH Variant (NATO Frigate Helicopter).