A MANOEUVRABLE FLYING TARGET - FROM CONCEPT TO FLIGHT TESTING

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Purpose – Aiming to present and discuss the requirements for flying targets - which sometimes are contradictory to each other, and to perform a trade-off analysis before the design activity is began. To demonstrate conceptual and preliminary design processes using a practical example of PW-61 case. To show how results of experimental flight tests using a scaled flying target will be described and analysed before manufacturing the full scale flying target.

Design/methodology/approach – Important part of the paper consists of the selection of tailplane configuration of the flying target UAV in order to protect some expensive on-board systems against serious damages, and to obtain a sufficient dynamic stability, independently of the amount of the petrol in fuel tank. Inverted V-tail, U-tail and H-tail configurations were considered and compared both, theoretically and in flight experiments.

Findings – Flight dynamics models and associated computational procedures appeared to be useful both, in a preliminary design phase and during the final assessment of the configuration after flight tests. Selection of the tailplane configuration for the flying target UAV is very important in order to protect some expensive on-board systems against serious damages, and to obtain a sufficient dynamic stability, independently of the amount of the petrol in fuel tank.

Practical implications – Flying targets should be speedy, maneuverable, cheap, easy in deployment and multi-recovered (if not destroyed by live ammunition), must have relatively low take-off weight and the endurance of at least 1 hour. This paper can be useful for proper selection of requirements and preliminary design parameters to make the design process more economically effective.

Originality/value – This paper presents very efficient method of assessing the designing parameters of flying targets, especially in an early stage of design process. Stability computations are performed based on equations of motion and are supplemented by flight tests using the scaled flying models. It can be considered as an original, not typical but very practical approach, because it delivers lots of data in early design stages at relatively low cost.