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Carina Marcus, Kent Andersson, Christina Åkerlind

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Balancing the Radar and Long Wavelength Infrared Signature Properties in Concept Analysis of Combat Aircraft - a Proof of Concept

Carina Marcus^{a,b,*}, Kent Andersson^{c,d}, Christina Åkerlind^{e,b}

^aSaab AB, SE-581 88 Linköping, Sweden

^bLinköping University, SE-581 83 Linköping, Sweden

^cSwedish Defence University, Box 27805, SE-115 93 Stockholm, Sweden

^dNational Defence University, P.O. BOX 7, FI-00861 HELSINKI, Finland

^eSwedish Defence Research Agency, SE-164 90 Stockholm, Sweden

Abstract

Designing combat aircraft with high military effectiveness, affordability and military suitability requires balancing the efforts of many engineering disciplines during all phases of the development. One particular challenge is aircraft survivability, the aircraft's ability to avoid or withstand hostile actions. Signature management is one way of increasing the survivability by improving the ability to avoid detection. Here, the long-wave infrared and radar signatures are studied simultaneously in a mission context. By establishing a system of systems approach at mission system level, the risk of sub optimization at a technical level is greatly reduced. A relevant scenario is presented where the aim is to incapacitate an air-defense system using three different tactics: A low-altitude cruise missile option, a low and medium altitude combat aircraft option. The technical sub-models, i.e. the properties of the signatures, the weapons and the sensors are modeled to a level suitable for early concept development. The results from the scenario simulations are useful for a relative comparison of properties. Depending on the situation, first detection is made by either radar or infrared sensors. Although the modeling is basic, the complexity of the infrared signature and de-

*Corresponding author

Email addresses: carma@ifm.liu.se (Carina Marcus), kent.andersson@fhs.se (Kent Andersson), christina.akerlind@foi.se (Christina Åkerlind)

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