

SIGNATURE MANAGEMENT AND DECEPTION



TNO innovation for life

Camouflage and deception have been used in conflicts throughout the ages. In this respect, the twenty-first century is no different. However, constantly changing operational contexts, coupled with the rapid pace of developments in platform and sensor technology, are creating a rapidly growing threat. This has led to an urgent need for countermeasures, to limit our own vulnerability. Over the past decade, research in this area has lagged behind. For this and other reasons, there is now an urgent need to make up lost ground. It will take considerable effort to bring our ability to protect personnel, military platforms and systems up to standard through signature management and to meet current and future operational requirements. The aim of this research programme is to develop the knowledge needed to achieve these goals.

INTRODUCTION

Signature management is essential to the survivability of military platforms and units. Even in twenty-first century battles, victory can often depend on such time-honoured skills as engaging in activities unnoticed and concealing your true intentions. If you are familiar with your own system's signature then you can take effective measures to mitigate the risk of detection, identification and neutralisation, or, at least, to delay detection. Another factor that can contribute to the effectiveness of military operations is the ability to deceive adversaries.

Recent decades have seen rapid developments in the field of platform and sensor technology (such as drones, thermal imaging, hyperspectral sensors and miniaturisation). In addition, the operational context and operational environment are constantly changing (e.g. urban warfare, littoral operations, etc.). It is essential to ensure that signature management meets current and future operational requirements, as this can reduce the vulnerability of military

personnel, platforms and systems. However, this will involve considerable effort. In addition, making the right choices in terms of resources and tactics requires evaluation techniques (and international standardisation) that are directly linked to performance under operational conditions.

OBJECTIVES

The aim of the programme is to develop and update knowledge in the field of signature management and deception within the land domain. This will help the Ministry of Defence to develop a comprehensive vision (embracing resources, applications, deployment and training) of the role of signature management and deception. That, in turn, will enable a more effective response to current and future threats.

SCOPE OF WORK

The initial goal of this programme is to create an overview of the anticipated threats, both now and in the near future. It will formulate relevant scenarios in which signature management and deception

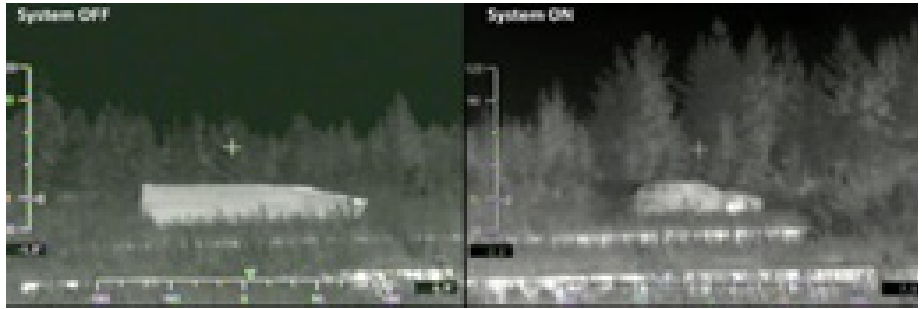
would be enormously useful, and outline the desired effects. This information will then be used to give direction to the overall research programme.

One aspect of the programme involves a broad-based investigation into the physical resources needed for signature management, as well as physical and psychological tools for military deception. We will explore various factors of relevance to operations in the land domain, such as effectiveness, feasibility, applications and methods of deployment. We will accumulate a body of knowledge through literature research, by means of exchanges with partners in international working groups, and by pooling existing knowledge from past national/international studies.

Evaluation methodologies are indispensable to the proper procurement, deployment and effective improvement of signature management and deception resources. With this in mind, we will create an overview of state-of-the-art evaluation methodologies. The data (or contextual data) required for evaluation purposes, such as representative backgrounds, will be collected in a terrain database. Selected evaluation techniques will be applied to the identified signature management and deception resources, in the context of militarily relevant case studies. This approach will enable us to evaluate both the evaluation methods and the resources at the same time.

The evaluation of signature management and deception resources will include theoretical research (via modelling) as well as laboratory tests and testing under operational conditions in the field. Wherever useful and possible, existing evaluation techniques and signature management and deception resources will be improved, or new ones developed.

Standardisation (including international standardisation) and applicability are also priority areas for the Ministry of Defence. The added value of using a single signature



management and deception resource will also be investigated, as will the added value of combined physical and psychological resources and techniques for signature management and deception. Finally, the most effective resources will be demonstrated and evaluated in practice.

This programme is consistent with various past and present studies at national and international level. The plan involves cooperative work in the context of the following four initiatives. The programme will support the European Defence Agency's (EDA) EUCAN (EUropean Camouflage Net) initiative. It will also contribute to the EDA's ACAMSII (Adaptive Camouflage for the Soldier) project, in which a multispectral adaptive camouflage soldier-system prototype will be implemented and demonstrated. Efforts will be made to link up with relevant NATO research groups, and the ongoing bilateral cooperation with DSTG (Australia) will be continued.

RESULTS

The programme will deliver an overview of relevant, state-of-the-art signature management and deception resources, plus validated methodologies for the evaluation of resources and tactics. It will also generate a range of products, models, evaluation techniques and reports that the Ministry of Defence can use to enhance its ability to respond effectively to operational challenges. A database will be established and maintained to house selected parts of the collected body of knowledge. This will make it possible to effectively safeguard and access the data in question.

ABOUT TNO

TNO is an independent research organization. We connect people and knowledge to create innovations that boost the well-being of society and the competitive strength of industry in a sustainable way.

TNO works in collaboration with partners and focuses on nine domains, including Defence, Safety and Security, where we focus on technological and behavioural innovations for people working in defence organizations, the police, emergency organizations and industry.

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PROGRAMME INFORMATION

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