

Product and services

Weapon System Performance Analysis



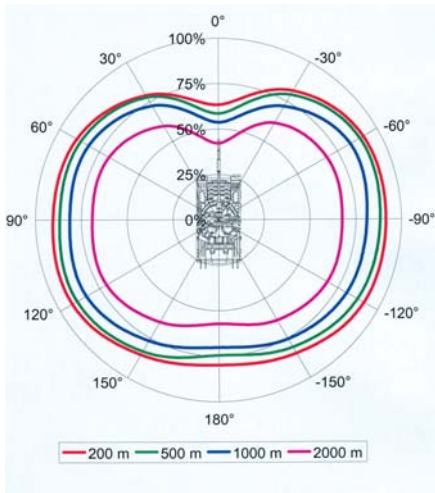
TNO is developing and maintaining the capabilities to study the performance of weapon systems and the ammunition that can be launched from those systems. Our main customer is the Netherlands Ministry of Defence. Over the years, we have supported the procurement of new weapon materiel, the upgrading of existing materiel and the employment of weapon systems. Our expertise in the field of performance assessment is also available for other government agencies and the international defence industry.

Context

Ideally, a full blown operational analysis of the contribution of an employed weapon system in the foreseen operational environment is used to assess the merits of such a system. Often however, the scope of such an analysis has to be reduced because of constraints in costs, time, knowledge etc. One of the focus areas of TNO is determining system level measures of effectiveness.

To this end, mainly simulation models are developed that are validated through the results of (scale) experiments, tests of system components in comparison of the qualities of simulation models with models of other, international, institutes.

The models will allow us for instance to give answers in terms of the required number of weapon systems or the required number of ammunitions to satisfy a certain military operational criterion, like neutralizing an enemy unit. Two examples of research areas are given here.



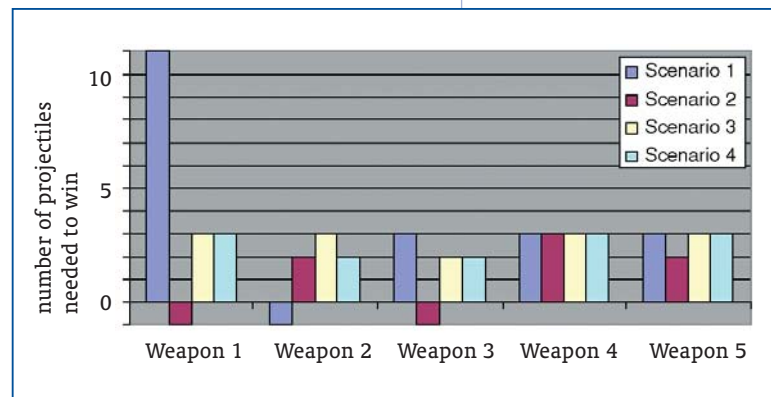
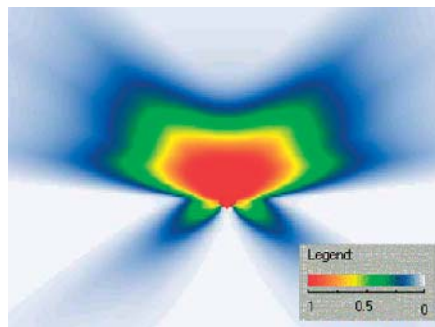
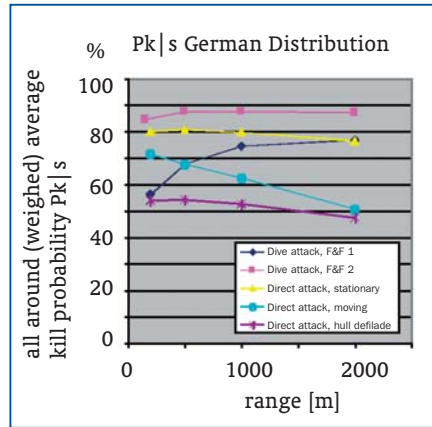
Fire support capabilities

Fire support effectiveness is the combination of weapon systems deployed firing their ammunitions in the target area and the vulnerability of the enemy unit or system in that target area for the warhead effects.

Analyses include trajectory calculations of unguided and guided munitions, their dispersion in the target area and the lethal effects caused by blast and fragmentation. The majority of the analyses is related to ground-based and naval fire support (i.e. artillery), but includes also ground-based air defense as well as naval air warfare. Specialized software has been developed or acquired to analyze the specific features of a weapon system, for example, the effectiveness of a land attack missile warhead (lethality plot shown) or the lethality of a naval artillery shell against incoming anti-ship missiles.

Manoeuvre warfare and anti-tank systems

For manoeuvre warfare, a set of models is used to determine the battle contribution of for instance anti-tank weapon systems. Analyses on several aspects for single targets (hit distributions and probabilities, warhead functioning and damage mechanisms, and kill probabilities) are used and combined in effectiveness models to analyse the weapon system performance in small scenarios. This can be done for several candidate systems to compare their merits. Such a comparison can support the procurement of weapon systems.



TNO Defence, Security and Safety

'TNO Defence, Security and Safety' is the title under which TNO operates as a strategic partner for the Dutch Ministry of Defence and makes innovative contributions to enhancing the security of the Netherlands both at home and abroad. We also use our accumulated knowledge for foreign governments and for defence-related industries.

R.B. Kalkhoven, M.Sc.
T +31 15 284 32 96
F +31 15 284 39 51

Lange Kleiweg 137
P.O. Box 45
2280 AA Rijswijk
The Netherlands

info-DenV@tno.nl
www.tno.nl

