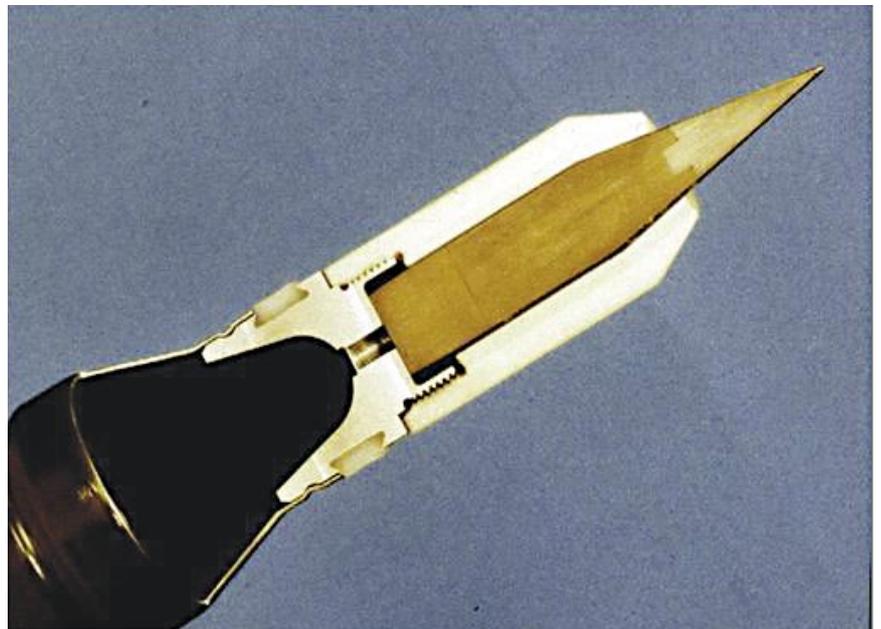
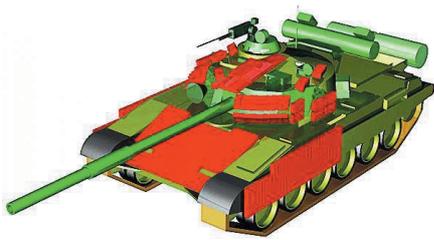
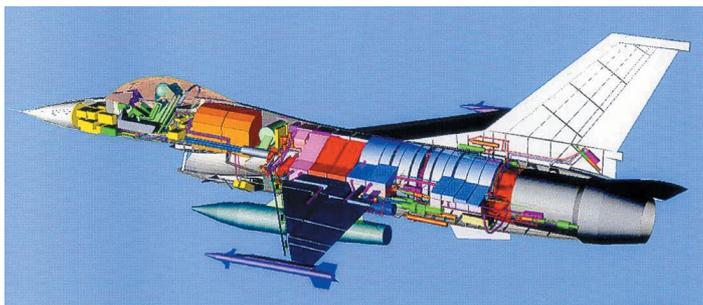


Research and technology

Vulnerability and Lethality Assessments for Defence Systems



TNO carries out a wide range of research, evaluation, consultancy and development projects in the area of vulnerability and lethality assessments.



- Functionally: determination of the functioning of the component after being damaged.
- Fault-tree combining the characteristics of damaged and undamaged components.

Context

Vulnerability and lethality modelling is concerned with munition performance analysis, target modelling and analysis of interaction of ammunition and materials and structures.

Munition performance analysis

Using results of firing tests or theoretical assessments, the capabilities of ammunition are determined:

- dynamic fragmentation characteristics.
- terminal ballistic behaviour.
- destructive capacity.

These data are then implemented in the vulnerability assessment code.

Target modelling

- Geometrically: a 3D representation using BRL-CAD.
- Physically, including material properties



Interaction assessments

In vulnerability and lethality assessments the ammunition is fired virtually at a weapon platform. Vulnerability is related to the operational platform capabilities, while lethality is related to the ability to degrade the platform capabilities.

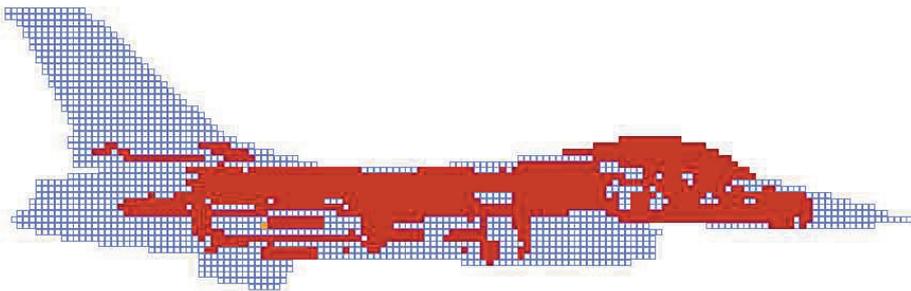
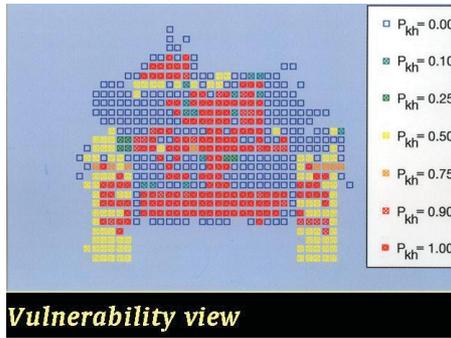
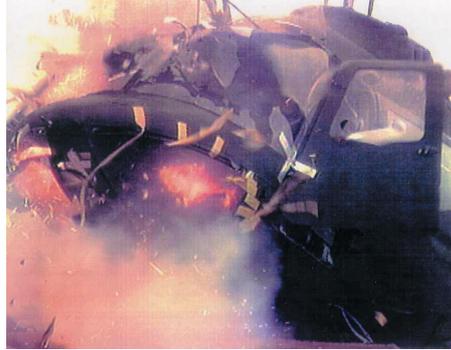
The results can be presented in vulnerability or lethality views, giving the kill probabilities or average kill probabilities.

These graphs enable direct comparison of platforms or ammunition types.

These types of assessments are often used in acquisition trajectories.

Project examples

- Lethality assessment of short-range and medium-range antitank weapons.
- Assessment of Frangible APDS ammunition versus flying platforms and light armoured vehicles.
- Modern antitank weapons versus modern ERA concepts.
- Vulnerability assessment of potential IFV candidates for the Dutch army.



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.

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