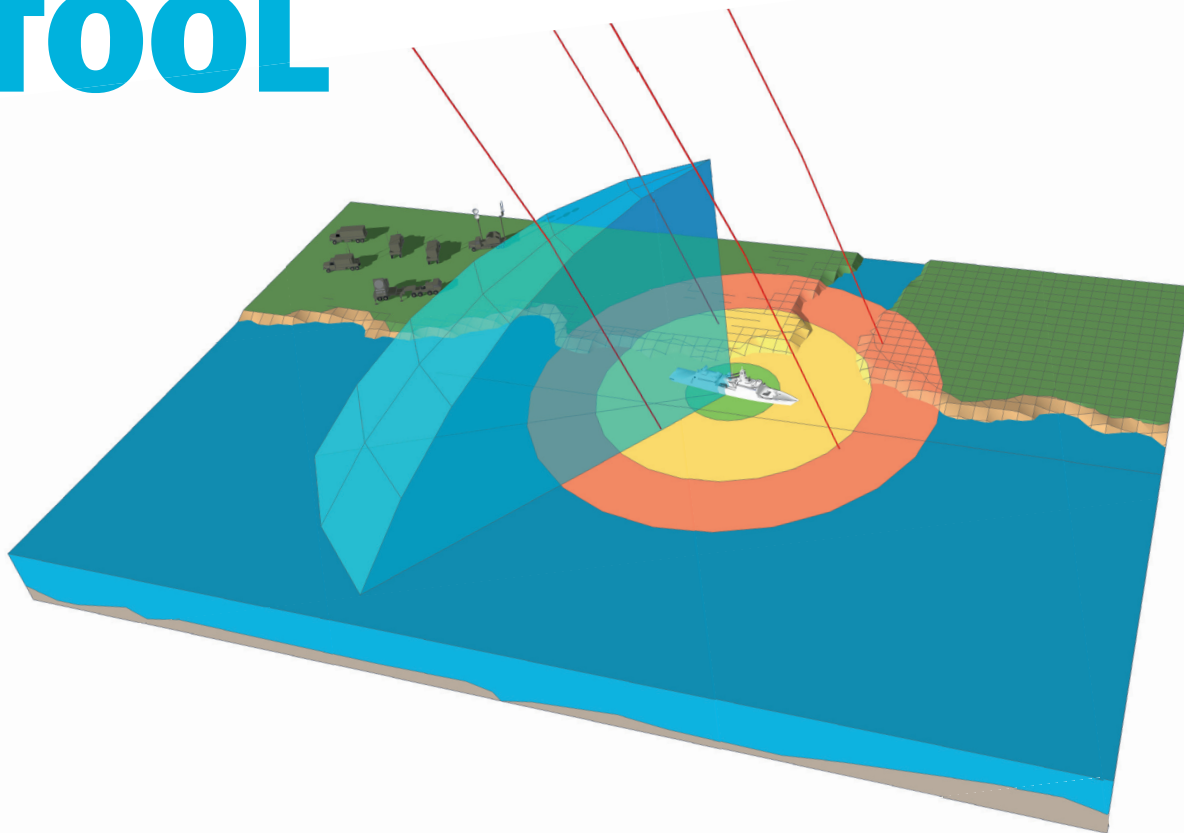


JOINT PLANNING TOOL



TNO innovation
for life

Creating an optimal defence design with multiple resources against air and missile threats is complex and requires numerous factors to be taken into account. TNO's Joint Planning Tool (JPT) was designed to address these challenges. It enables multilayered defence planning and supports planning of a single defence system up to a full Joint Air and Missile Defence (JAMD) architecture at all levels of detail and command.

JPT supports the entire planning cycle of a JAMD mission. It is developed as stand alone software that utilises the system modelling of the powerful simulation suite JROADS. This suite is a proven capability used in analysing, test bedding and training Air and Missile Defence. Models can be configured to the required fidelity level.

The combination of a user friendly interface, quick assessments and a powerful simulation backbone brings air defence planning and analysis to a whole new level.

CREATING AN OVERALL DEFENCE DESIGN

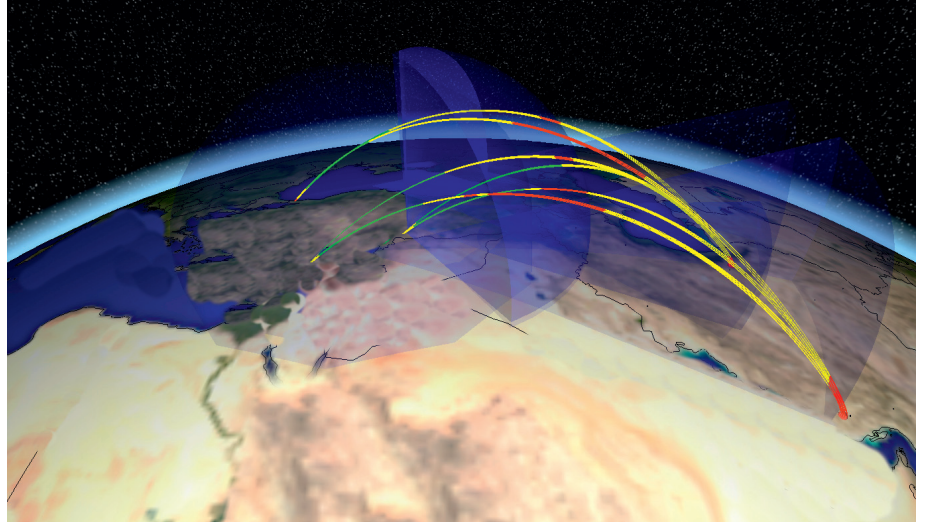
With JPT you will first create an overall defence design, after which you can analyse the feasibility of this design, and finalize the planning of individual systems.

JPT offers:

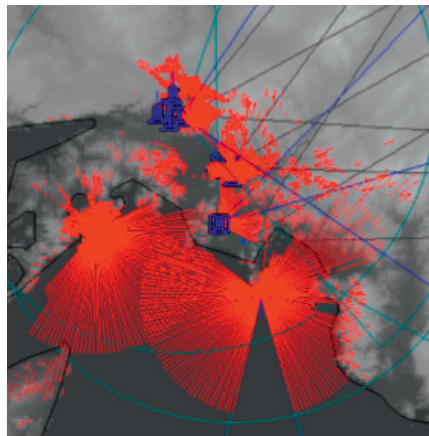
- Sensor and weapon ranges of a defence design;
- Coverage areas against specific threat trajectories;
- Line Of Sight (LOS) diagrams;
- Intercept diagrams against Air Breathing Threats (ABT);
- Footprints, defended areas, launch areas denied and operating areas.

Planning with JPT starts with a prioritised asset list and threat estimate. A defence design can be created, imported or adjusted as required. JPT provides an overview of the defence design by visualizing the sensor and weapon ranges of each of the planned resources, such as early warning, land and sea based upper layer, lower layer and short range air defence systems.

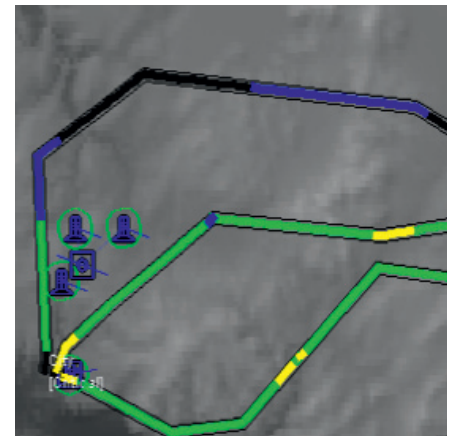
Second, JPT supports analysis of the feasibility of a mission. Both Ballistic and Air Breathing threats can be specified and JPT generates the threat trajectories. The sensor and weapon coverage of the threats is calculated and visualized in a timeframe of seconds. After adjusting weapon system locations, assets or threats, the operator is directly given feedback on whether this is improving or degrading effectiveness. Footprints can be loaded or calculated to show the area defended by lower layer systems. These visualisations show the potential short falls of the defence design which enables the planner to improve the design iteratively.



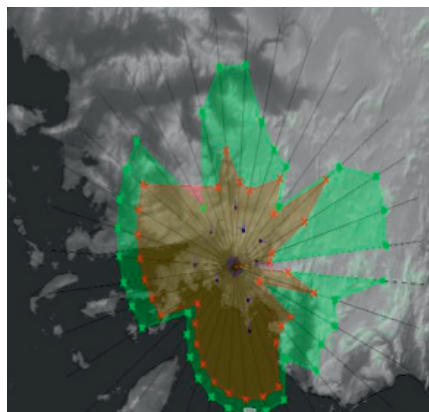
3D Visualisation



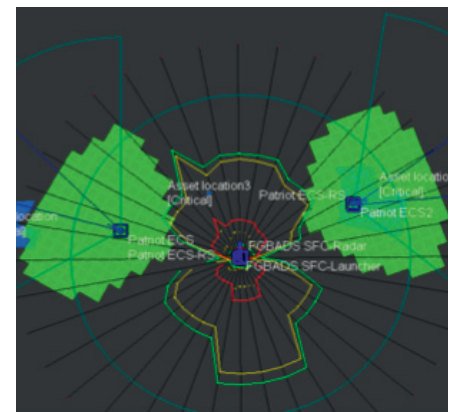
LOS diagrams (sensor coverage)



ABT Battlespace



ABT Intercept Diagrams
(simulation)



Architecture Gridruns
(simulation)

REFINING THE DEFENCE DESIGN

Then, the defence design can be further refined at the battalion level. Weapon system experts plan launchers and sensors. JPT supports this process by visualising line of sight diagrams of each individual sensors and calculating battle space against specific threats defined by the operator. JPT offers terrain profiling to support the operator to improve the sensor coverage. The effectiveness of a detailed plan can be verified by simulation of the threat scenarios. The simulation results of an ABT scenario show the exact expected locations of detections and interceptions of the battalion. Also, utilizing simulation, defended areas, launch areas denied and operating areas against ballistic threats can be calculated for a specific part or the entire defence design.

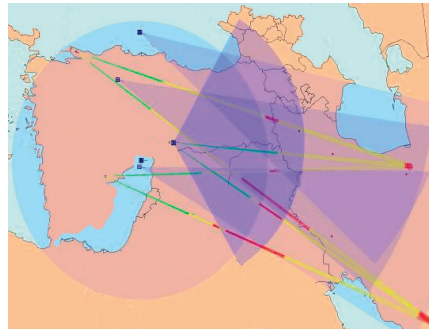
Finally, JPT offers many views that support mission planning and debriefing at each command level. Also, JPT has xml-based import functionalities to integrate several parts of a plan (e.g. battalion level, or task force) into a complete design.

TRACK RECORD

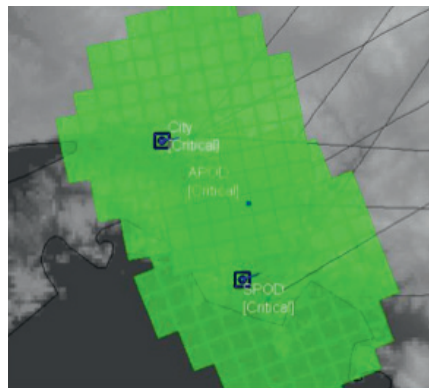
JPT has proven to be successful during the multinational air and missile defence exercise JPOW X in 2008, performing as planning aid for the Dutch Navy and Italian Armed Forces at tactical level as well as operational level. In the period 2008-2010 JPT has been further developed and used by the Dutch Armed Forces during the Air Warfare Course Gammeldansk, exercise Frisian Flag and JPOW 2010. JPT is also in use to support the NATO Missile Defence studies in determining feasibility of and requirements for NATO Missile Defence.

PLANNING YOUR AIR DEFENCE SYSTEM?

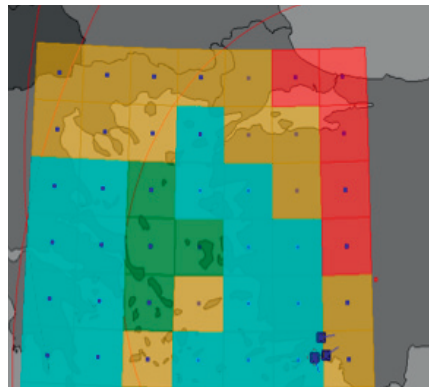
We are looking forward to work with you on planning and analysis of your JAMD capabilities.



TBM Battlespace



TBM Footprints



TBM Gridruns (simulation)

JPT OFFERS MANY VIEWS THAT SUPPORT MISSION PLANNING AND DEBRIEFING AT EACH COMMAND LEVEL

TNO.NL

TNO

TNO is an independent innovation organisation. TNO connects people and knowledge to create innovations that sustainably boost the competitive strength of industry and the welfare of society.

TNO focuses its efforts on seven themes including Defence, Safety and Security: TNO focuses on a safe and secure society by creating innovations for people working in the armed forces, law-enforcement agencies, emergency services and industry.

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