



NATO MODELLING AND SIMULATION
CENTRE OF EXCELLENCE
ROME, ITALY



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TO: See Distribution

SUBJECT: **1st NATO Modelling & Simulation COE seminar “Systems Tool Kit (STK) for military applications”, Rome, 03-07 November 2025.**

DATE: 30 June 2025

REFERENCE(S): A. NATO M&S COE Program of Work 2025.
B. Bi-SC Education and Individual Training Directive 75-7

1. It's my pleasure to inform you that the NATO Modelling & Simulation Centre of Excellence is organizing the 1st Edition of the seminar **“Systems Tool Kit (STK) for military applications”** from **November 3rd to November 7th, 2025**, at the M&S COE premises, in Piazza Villoresi 1 00144 Rome.
2. The seminar is an initiative of the NATO M&S COE in cooperation with GM Spazio company and will focus also on ELMO® (Electromagnetic Layer for Multidomain Operations) and Shield Master software developed to be used as potential gap filler for the NATO M&S requirements.
3. The seminar aims to provide knowledge and skills to operate the STK fundamental operator functionalities for military applications. STK is a software for digital mission engineering and systems analysis, which allows to model and simulate complex systems in their operational environments. STK provides capability to model complex systems inside a realistic, time-dynamic and three-dimensional simulation that includes high-resolution terrain, imagery, RF environments, and more.
4. You are encouraged to **register no later than 30 of September 2025**. The seminar will be carried out with 20 available seats assigned on a “first come, first served basis”.
5. For registration and administrative instructions, please check the “Admin Instructions” at: <https://www.mscoe.org/courses/stk-course/>. Should there be any clarification needs, the seminar POCs are: **CDR (ITA N) Dino D. TROPEA**, E&T Section Chief, Tel. +3906469124383, e-mail: mscoe.det06@smd.difesa.it.; **LTC (ITA Army) Piergiorgio VENTURA**, CD Section Chief, Tel.+3906469124387 e-mail: mscoe.cde02@smd.difesa.it.

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COURSE TITLE: "Systems Tool Kit (STK) for military applications"

AIM: This five-day seminar offers a practical and structured introduction to AGI's Systems Tool Kit (STK) to model and analyze aerospace and defense scenarios across the air, space, and electromagnetic domains. Aimed at professionals involved in mission design, operations, and system analysis, the seminar blends theoretical foundations with hands-on exercises to build confidence in the use of advanced simulation tools.

Participants will work on realistic scenarios involving aircraft operations, satellite maneuvers, radar systems, and communication links, progressively developing multi-domain simulations that reflect current operational challenges. Key STK modules such as Aviator, Astrogator, and Communications will be used throughout the course to provide a complete overview of the platform's capabilities.

The fourth day is focused on Shield Master, a software solution developed by GMSPAZIO for missile defence network analysis. Through Shield Master, participants will gain an understanding of threat modelling (including ballistic, cruise, and hypersonic missiles), radar coverage simulation, and defence system deployment. In the last part of the seminar, the NATO M&S COE's Electromagnetic Layer for Multi-domain Operations (ELMO) will be presented.

By the end of the training, attendees will be equipped to independently design and evaluate complex aerospace and defence scenarios using STK and to explore advanced capabilities related to missile threat response planning with Shield Master.

Date: 03-07 NOVEMBER 2025.

Duration: 1 week

Seminar structure: Resident

Target Audience: Personnel coming from NATO Bodies and NATO Nations, in possess of experience in modelling and simulation

- a. Rank Level:** Officers (OF), Other Ranks (OR), Civilians
- b. Language Proficiency:** English: 3,3,3,3. IAW STANAG 6001
- c. Pre seminar knowledges:** NA

Classification: NATO UNCLASSIFIED

DISCIPLINE: Modeling & Simulation

Area: Simulation Systems.

ADMIN NOTE: See Administrative Instructions published on the M&S COE web site.

Using STK functions, a first approach with the GMSpazio's Missile Defence Analysis Toolkit (Shield Master) and NATO M&S CoE's ELMO introduction

Day 1 (Monday, November 3, 2025): Using STK for Air Domain scenarios

- Understanding and using STK Aviator capabilities
- Using the Aviator Catalog Manager
- Insert the landing and takeoff runway
- Insert an Aircraft object
- Understanding and using the Aviator propagator
- Introduction to the Mission Window
- Construct flight phases and procedures
- Produce customizable Reports
- Visualize and animate the flight route on the 2D and 3D map

Day 2 (Tuesday, November 4, 2025): Using STK Astrogator for Space Domain scenarios

- Understanding and using STK Astrogator capabilities
- Introduction to orbital maneuvers
- Introduction to launch vehicles
- Insert a satellite object
- Understanding and using the Astrogator propagator
- Introduction to the Mission Control Sequence
- Design a transfer orbit from LEO to GEO
- Visualize possible orbits in the 3D window
- Circularize the GEO orbit
- Generate a summary Report of the entire Mission Control Sequence

Day 3 (Wednesday, November 5, 2025): Using STK Communications/Radar for Electro Magnetic Spectrum Operation scenarios

- Radar scenario setup
- Insert a target aircraft and creating the route
- Introduction to the concept of Radar Cross Section
- Insert a radar site and its antenna
- Modelling an airport surveillance Monostatic Radar
- Calculate accesses and generate reports
- SATCOM scenario setup

- Insert a terrestrial observation satellite
- Modelling a transmitter
- Modelling a receiver
- Calculating a communication link budget
- Effect of meteorological phenomena and system noise temperature on the link budget

Day 4 (Thursday, November 6, 2025) – Introduction to Shield Master for Missile Defence Network Analysis

- Introduction to rocket physics
- Introduction to threats: ballistic, cruise, and hypersonic
- Software overview
- Database management
- How to build a scenario
- Threats: ballistic, cruise, and hypersonic missiles
- Defence Network: Radar and defence batteries
- Generating graphs and reports
- Scenario examples

Day 5 (Friday, November 7, 2025): Introduction to ELMO (Electromagnetic Layer for Multi-domain Operations)

- EMSO & ELMO Architecture Fundamentals
- Scenario Setup & Simulation
- Visualization & Data Interoperability
- Scenarios Overview

