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<td>See also ADM001676, UAV 2002 Conference &amp; Exhibition., The original document contains color images.</td>
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Presentation Contents

- Silver Arrow company overview
- Mission trainer highlights and overview
- System configuration and features
Established 1985

In-house UAV experience of 17 years, based on IDF operational experience of 27 years

Prime supplier of tactical new generation UAV systems to the IDF
Hermes 180

Catapult launch, parachute/airbag recovery

Day + night + laser designator payloads

General data:

- Gross weight 180Kg
- Wing span 6m
- Ceiling 15Kft
- Endurance 10 hrs
- Payload 32Kg
- Power supply 1.2Kw

Silver Arrow A Subsidiary of EII Systems
HERMES 450
**General data:**
- Gross weight 450Kg
- Wing span 10.5m
- Ceiling 18 Kft
- Endurance 20 hrs
- Payload 150 Kg
- Power supply 2.2Kw

**Real-time day & night imagery SAR**

**Other**
General data:
- Gross weight 1500Kg
- Wing span 15m
- Ceiling 30Kft
- Endurance 25 hrs
- Payload 350Kg
- Power supply 9.8Kw

Day & night imagery + SAR

Maritime patrol & other
Technologies & Expertise

- Composite Structure
- System Engineering
- System Integration & Testing
- Avionics (H/W, S/W)
- Rotary Engines
- Command & Control
- Electro Optics

Silver Arrow
The Need For UAV Trainer

- Reducing the number of actual sorties
- Disregarding the actual weather conditions and technical availability
- Many airborne and ground subsystems to operate and control
- Training in emergency and malfunction situations
- Capability of mission rehearsal
“Everything is possible. The impossible just takes a bit longer...”

Visual Simulation
The UAV Trainer Goal

To enable the GCS operators to train mission planning and execution in their own natural operational environment.
Trainer Highlights

- 3D terrain DB with resolution of up to 25 cm/pixel
- Day (CCD camera) and night (FLIR) sensor simulation. Including noise, jitter, and variations in sensor responsiveness
- Realistic frame rate generation
Trainer Highlights

- Continuous zoom and video rotating and tilting
- 3D ground tracking vehicles (stationary and mobile)
- DIS compliant
Trainer Highlights

- The UAV flight model (6DoF) is simulated in detail
- Full simulation of the UAV systems
- The electro-optical tracking system is simulated
Trainer Highlights

- Dedicated scenario generator

- Ability to train both in normal operating environment and in malfunction / emergency situations
Trainer Highlights

Covering the full range of mission phases:
- Mission planning
- Cruising
- Reconnaissance
- Surveillance tasks: artillery adjustment, damage assessment and more.
Trainer Highlights

Training in the actual operators’ environment - standard GCS environment.
Weather and Battlefield Effects

- Fog/Haze with control over the visibility
- Clouds - various kinds of 3D, radiometric correct clouds with control over their location, altitude and density
- Ground shadows for the ground objects
Weather and Battlefield Effects

- Smoke and dust with accurate display both in visible light and thermal view, swaying according to the wind.

- Various kinds of explosions and fire with accurate display both in visible light and thermal view.
General Configuration

- GCS
- UAV Trainer
- Scenario Generator
- UAV Simulator
- Video Generator
- Telemetry Comm
- Video
- LAN
The UAV and UAV systems simulator is a real-time simulator which simulates:
- UAV flight (6 DOF)
- Payload operation (except the video)
- UAV communication
- UAV systems
The High-Resolution Visual Video generator generates “real” video of the outside world including:

- Terrain
- Ground vehicles (both stationary and moving)
- Weather affects such as clouds and haze conditions
- Special effects such as explosions, smoke and dust
High-Resolution Visual Video Generator

Realistic 3D Video:
- Smooth movement across the terrain
- Smooth zoom (change of FOV)
- Rotation and tilt according to the UAV and payload maneuver
The High-Resolution Video Generator produces both regular daylight visual output and day/night FLIR output.
Video Examples
Video Examples
Video Examples
Video Examples
Video Examples
Video Examples
Scenario Generator

The scenario generator is implemented in the instructor station. It is used during the preparation and running stages of the exercise.

The scenario generator is used to create, update, and control the training scenarios.

A scenario includes the terrain, ground vehicles, weather conditions, training parameters, events and malfunctions.
Scenario Generator

The control functions allow the instructor to:

- Start / stop the exercise
- Jump forward and backwards in time
- Inject events such as faults and weather changes in real-time (overriding the events in the scenario)
Joint Distributed Training

The tactical UAV mission trainer is DIS compliant (simulation comm. protocol)

Create joint distributed training environments. Different units can train and interact on the same scenario at the same time.

Joint and cross platforms/systems/units operations training (intelligence forces, artillery units, air support squadrons etc.)
UAV Trainer Configurations

• The Trainer has four basic configurations:
  – Embedded Trainer
  – Low-End, Low-Cost deployable / stationary trainer, based on NT graphic platform
  – High-End graphics, deployable / stationary trainer, based on SGI’s ONYX 2 machine.
  – Training center.
Video Example