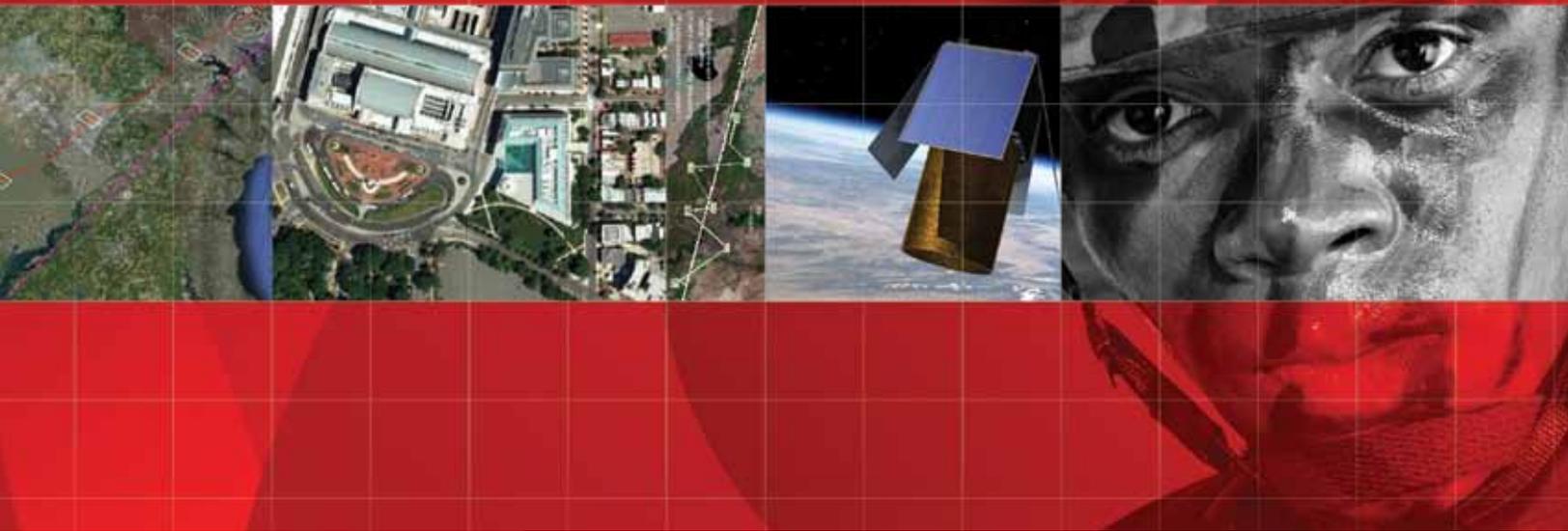




KESTREL EYE

Kestrel Eye Visible Imagery Nanosatellite Technology Demonstration



Summary

- Nanosatellite technology demonstrator weighing about 10 kilograms
- Electro-optical imaging satellite with 1.5-meter ground resolution
- Low cost: \$1M per spacecraft in production mode
- Operational life of greater than one year in Low Earth Orbit
- Tactically responsive: Ability to task and receive data from the satellite during the same pass overhead
- As revolutionary as moving from the "film bucket return" era to digital transmission: persistent availability down to the individual Soldier

A small, low cost, visible imagery satellite demonstrator that offers the tactical-level ground component Warfighter real-time imagery.

The Technology Center is developing Kestrel Eye as an electro-optical nanosatellite-class imagery satellite that will be tasked by the tactical ground component Warfighter. Capable of producing 1.5-meter resolution imagery, Kestrel Eye's data will be downlinked directly to the same Warfighter via a data relay network that is also accessible by other Warfighters in theater without any continental United States (CONUS) relay or data filtering. The intent is to demonstrate a tactical space-based imagery nanosat that could be proliferated in large numbers to provide a persistent capability to ground forces. The primary objective of the demonstration will be to task the satellite to take a picture of a designated ground object of interest and have that image relayed back to the ground Warfighter during the same satellite pass (i.e., within an approximately 10-minute tasking-to-product cycle).



The Kestrel Eye program will extend the Unmanned Aerial Vehicle (UAV) paradigm into space: a dramatically lower unit cost and proliferated numbers of satellites enabling the system to be dedicated to and operated by Warfighters who receive only parceled-out service today from more powerful, expensive and far less numerous assets. The eventual goal is persistent coverage available to every Soldier on a handheld device – as GPS is today. The CONOPS for this experiment involves very small satellites, laptops and S-Band receiver antennae.

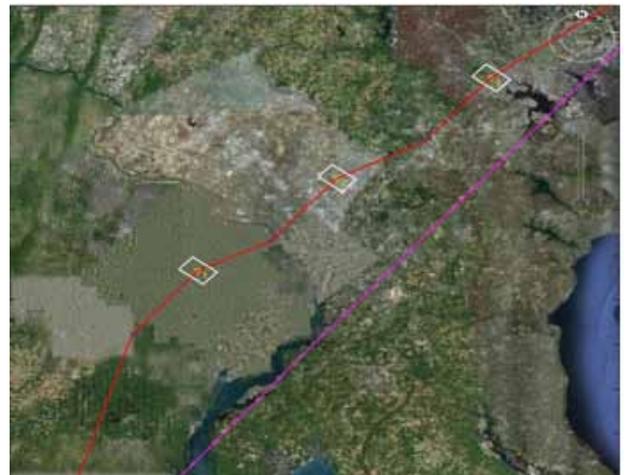
Kestrel Eye advantages include:

- Higher altitude than UAVs: coverage above denied areas and invulnerable to surface-to-air missile threats
- Smaller size and greater number: affordable, persistent presence, lower probability of detection, less vulnerable to anti-satellite weapons
- Graceful degradation: no single shot, launch failure or anomaly causes complete loss of service

Operational Concept for the Kestrel Eye Field Portable Ground Station:

1. The operator clicks on any point of the ground trace displayed on the world map and calls up the enlarged local map.

2. The operator loads objects/areas of interest by designating them with mouse clicks. The positions can be adjusted by dragging and dropping. The approximate photo footprints are shown by white rectangles.
3. The object track (red) is automatically updated as objects/areas of interest are added. If an object/area of interest is beyond the maneuvering capability of the spacecraft, then the operator is warned by a pop-up display.
4. When satisfied, the operator clicks on "Send to Spacecraft" and the requested trajectory is transmitted.
5. Kestrel Eye executes the planned track and snaps pictures at the designated times.
6. Kestrel Eye immediately downlinks the requested images to a data relay network accessible by the Warfighter who tasked the satellite as well as any other Warfighter on the network who needs it.



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