High Altitude - True persistent surveillance

SSRP

Stratospheric Sensor and Relay Platform

NATO Naval Armaments Group, Brussels
Workshop on Counter Piracy Equipment and Technologies –
04th of June 2009,

COS-Systems
www.cos-systems.com
Düsseldorf, Germany

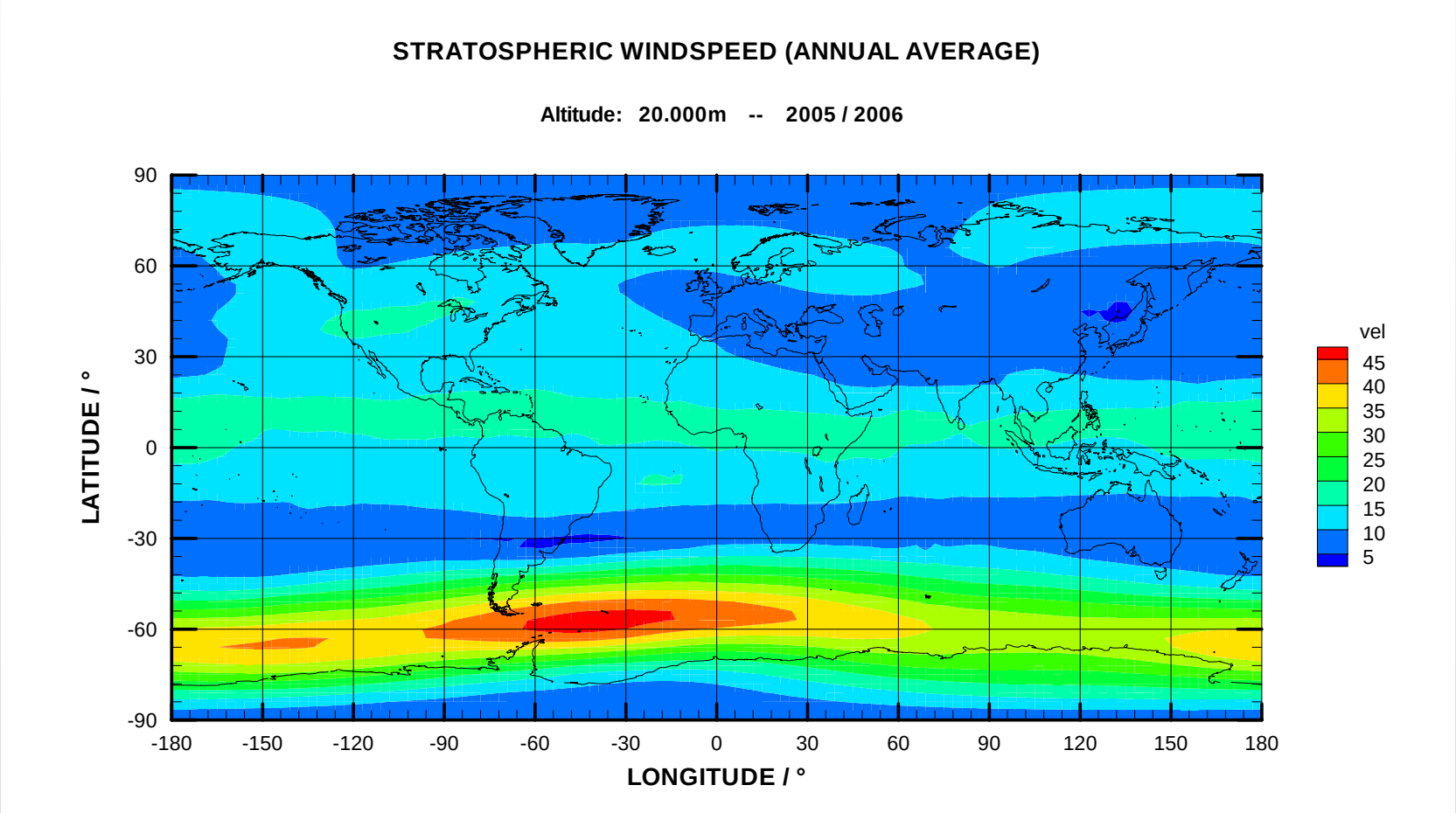
The SSRP is a Hybrid

combining aerostatic with aerodynamic principles

A serious alternative to satellites

Understanding the environment

Winds, UV Radiation, Ozone, Air Properties, Thermal Conditions, Neutron Flux, Atmospheric Electrodynamics…



The path to the System:
From Operational Requirements to System Requirements

1. Altitude between 17 and 22 km asl
2. Restriction V_{Wind} min (>5m/s <25m/s)

   dependant on latitude and Season

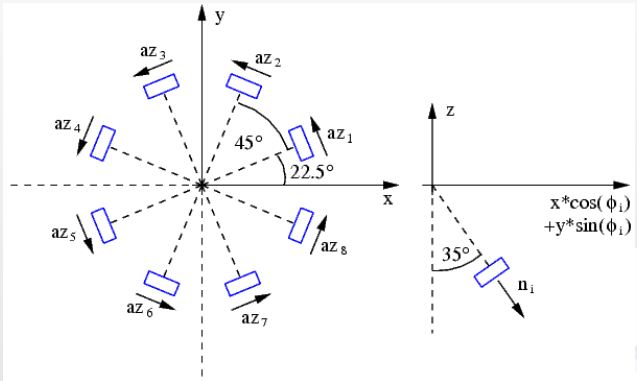
4. $V_{Wind} \longrightarrow Propulsion_{demand}{}^{3}$ (Regenarative Energy Supply 130 kW)
5. Propulsion demand determines System Size
6. Low Speed and low density (1/14 Air)

   determine Design Factors

7. Cosmic radiation (Gamma) requires Redundancy
8. Sensor Integration is major Design Driver (Sensorload > 5t)

The path to the System:
Design Driver: Integration of Sensors (Radar/SAR)

88 Antennas: 24 Transmitting, 64 Receiving



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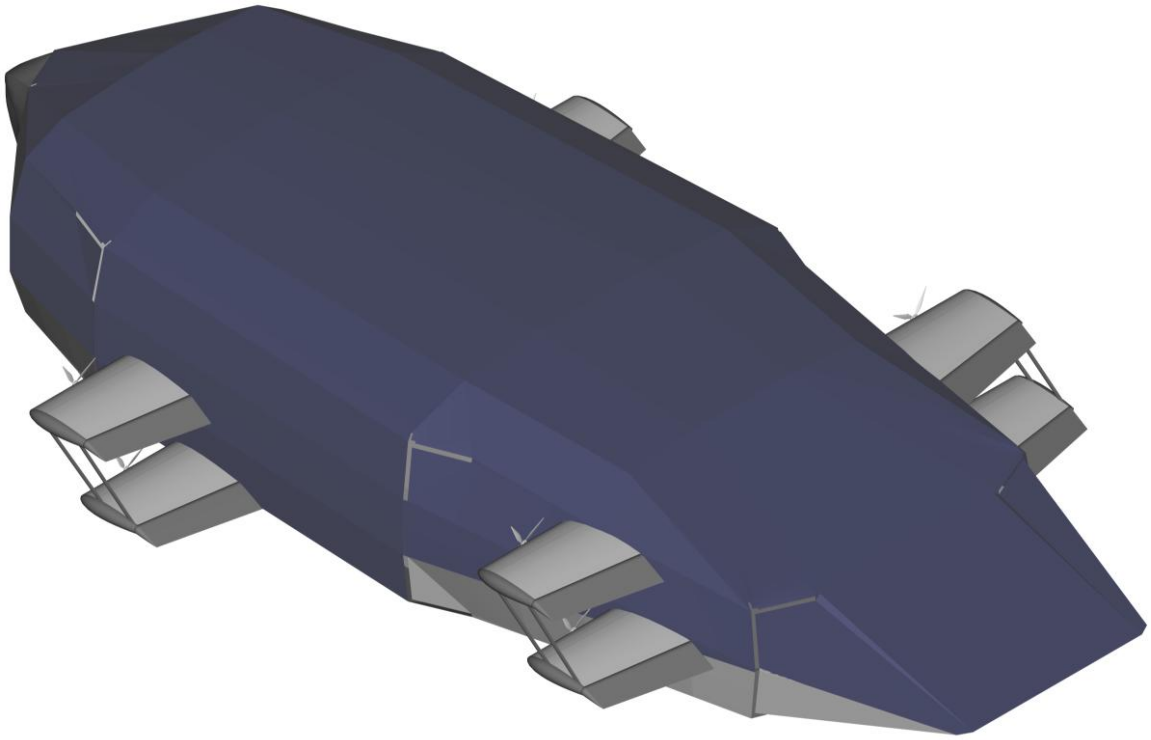
3-D CAD Model



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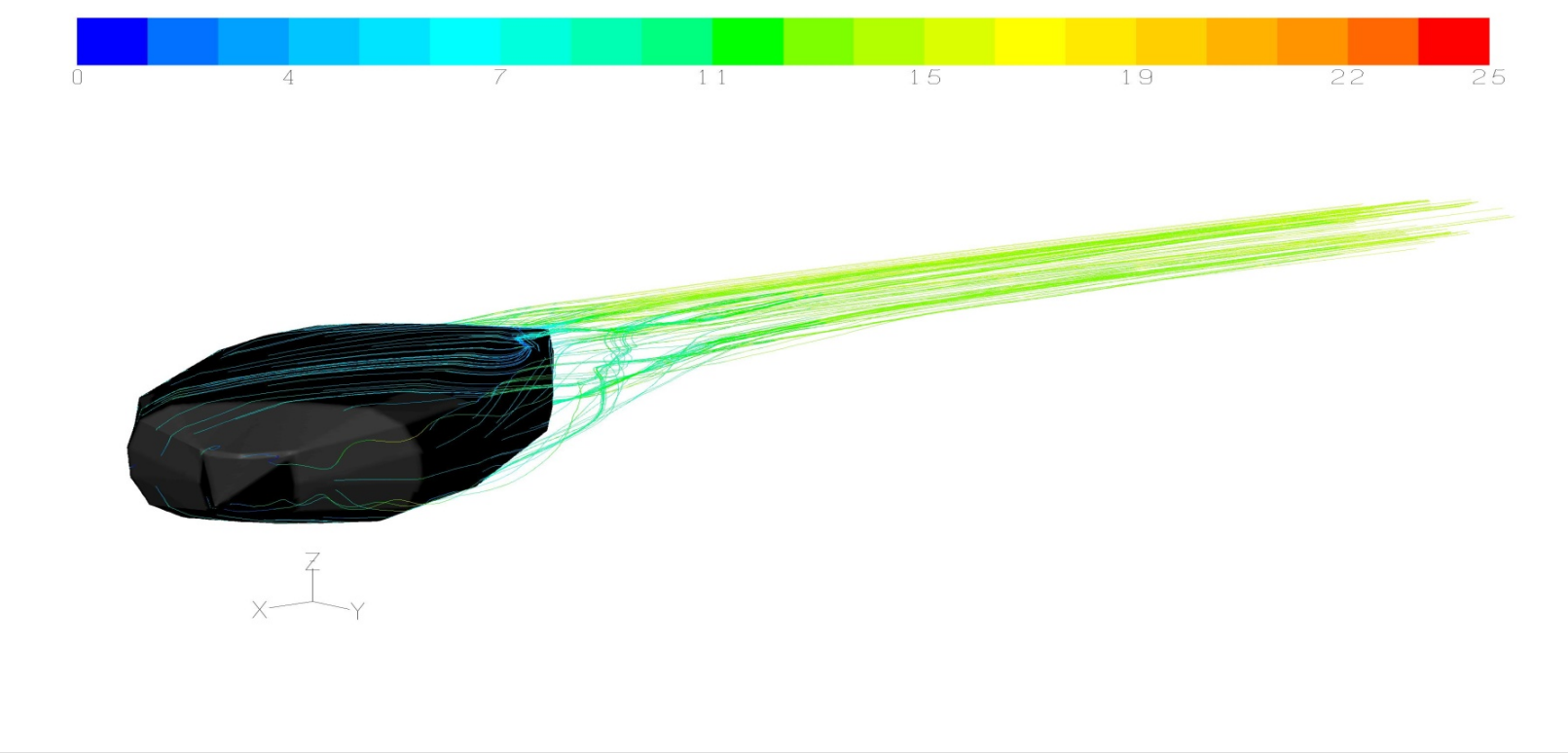
Understanding the physics

Aero Dynamics, Fluid Dynamics, Structural Mechanics, Thermo Dynamics, Flight Control…



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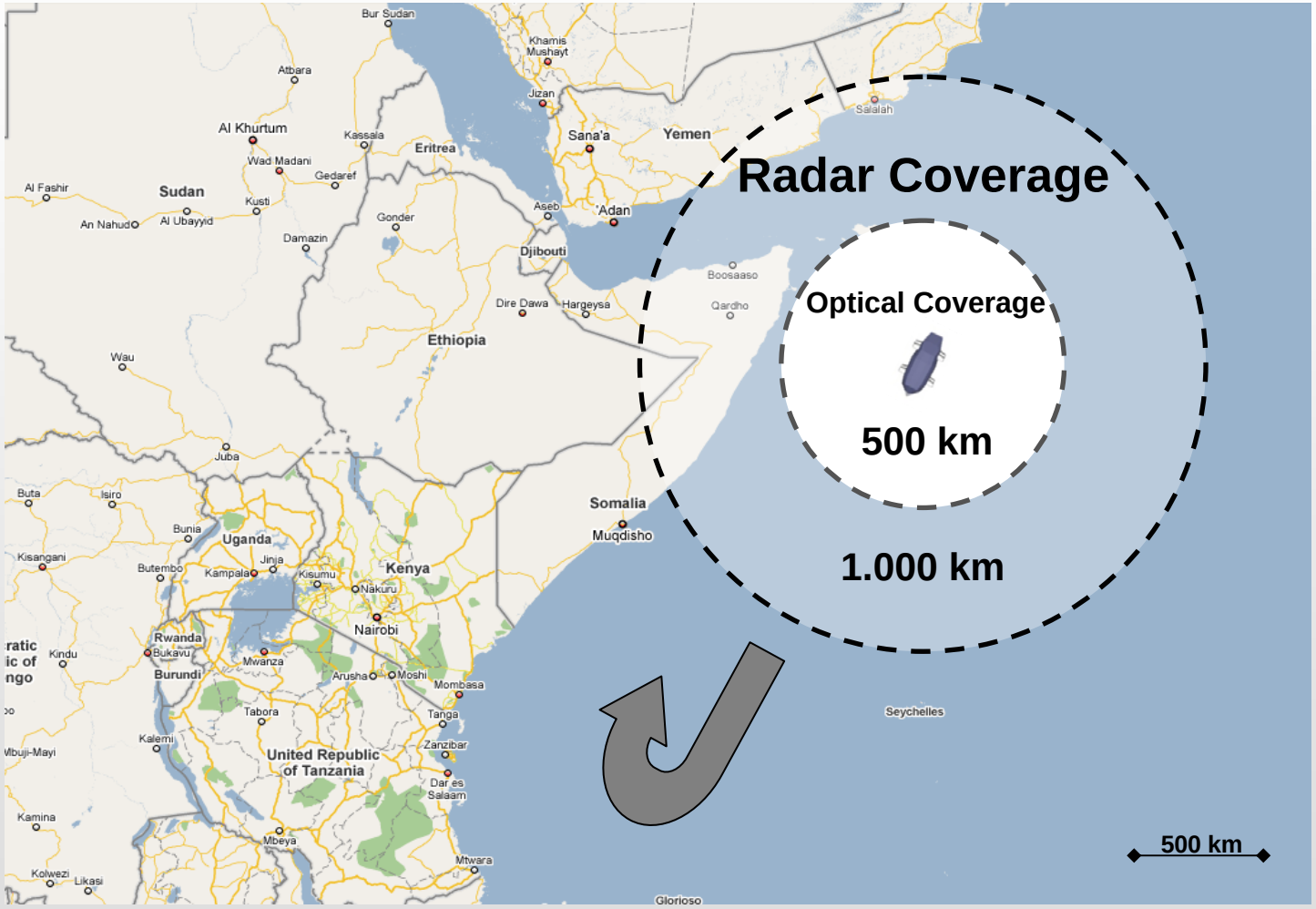
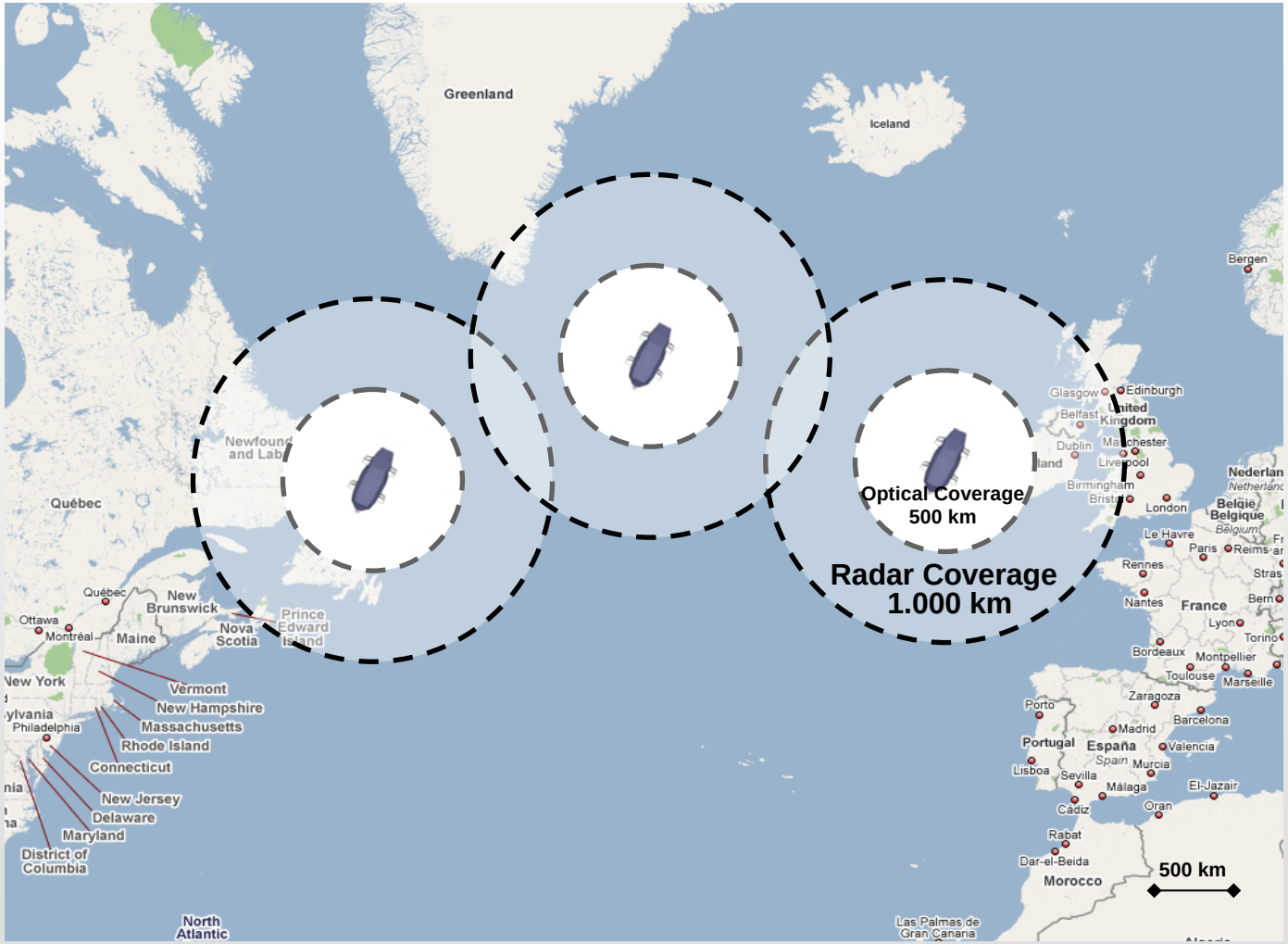
Sensor Coverage
Patrol Mode (50km/h)



Sensor Coverage
Station Keeping Mode



Sensor Coverage

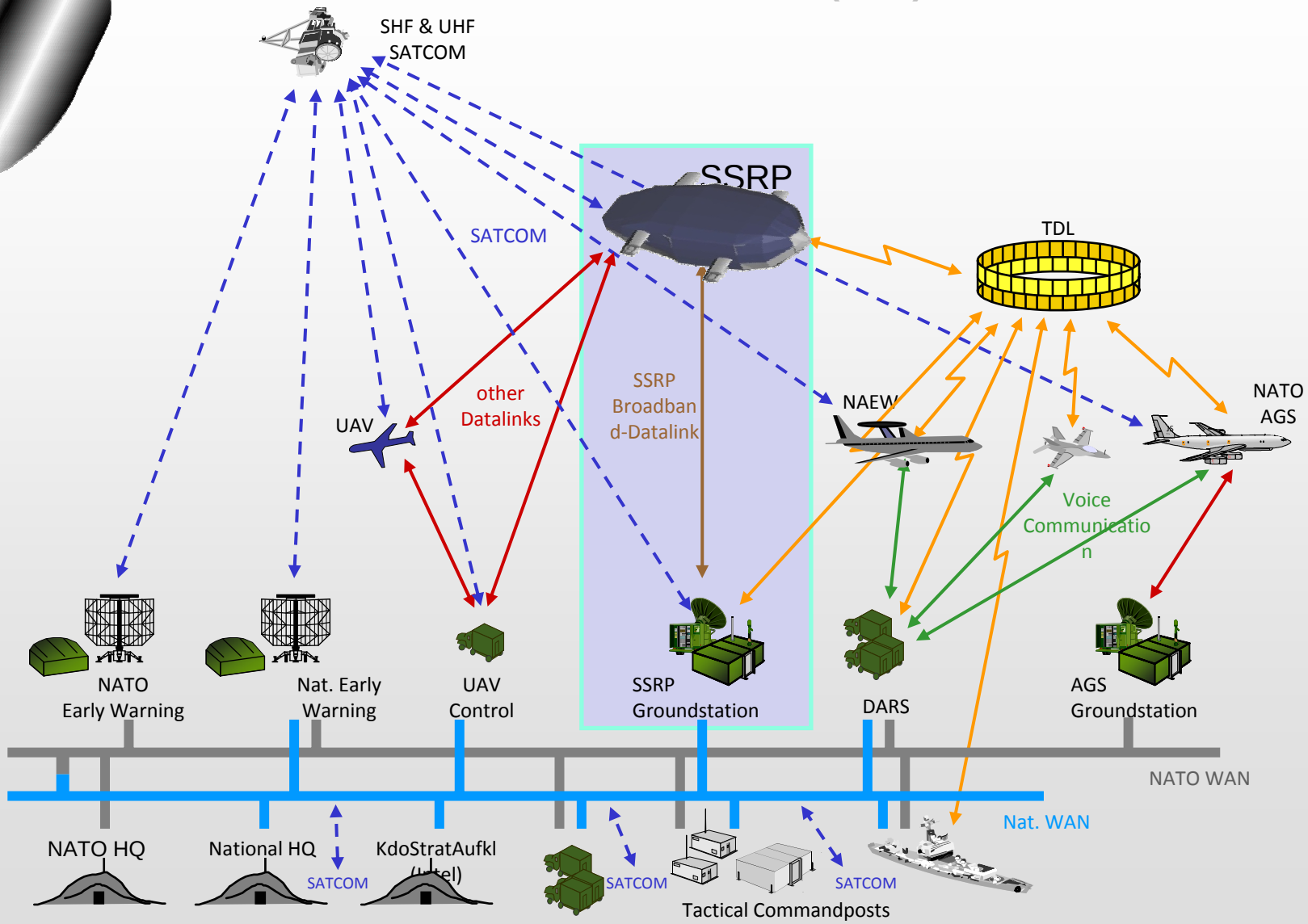
Persistant Surveillance (12-18 months)
Communication and Data Relay

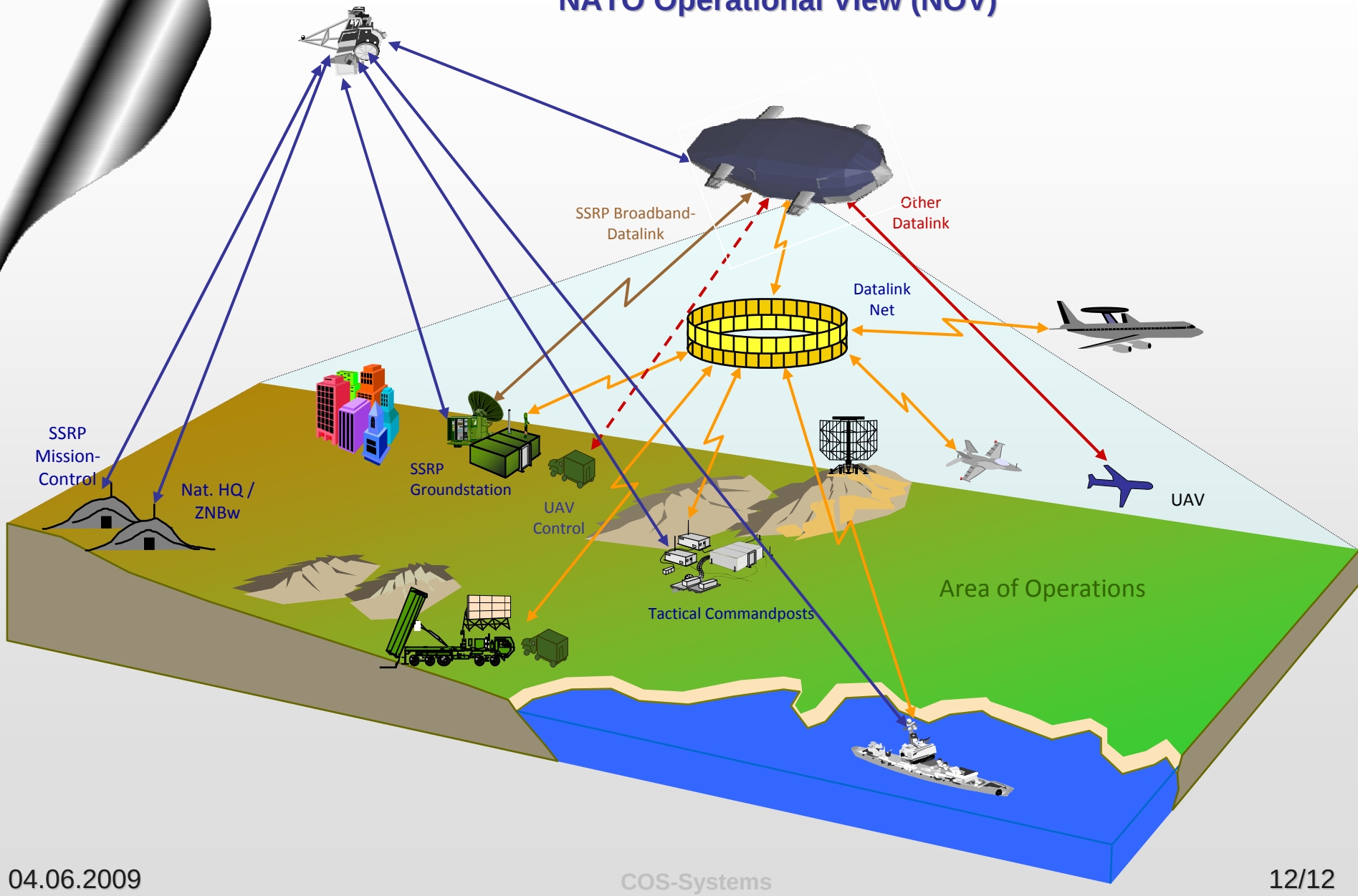
to support:

Precise Target Location and Designation /SAR-GMTI
Surface and Sub-Surface Surveillance
Digital Mapping and Early Warning (EW)
Ballistic Missile Defence (BMD) at a distance of 1000km
Tactical Data-Links
High resolution imagery

System Architecture SSRP (NAF)

NATO All View (NAV)



System Architecture SSRP (NAF)

NATO Operational View (NOV)