



Zephyr HALE UAS

(High Altitude Long Endurance Unmanned Aerial System)



European Command & African Command
Science & Technology Conference 8th – 12th June 2009

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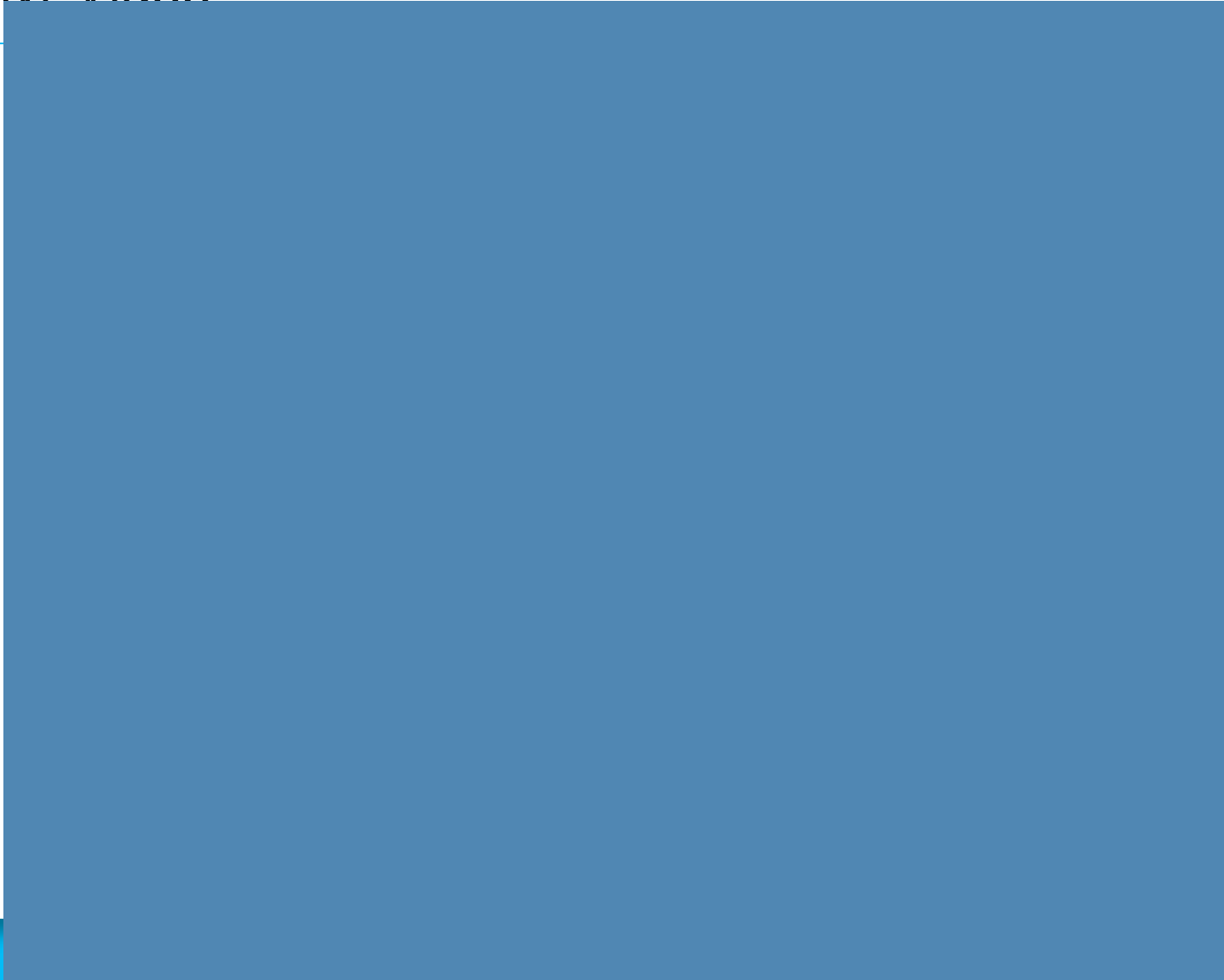
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Zephyr Video



Zephyr Programme Objective

Design a HALE UAS to fly for months at a time:

Solar powered to provide 3+ months flight endurance

Solar charged batteries provide power throughout the night

Operating altitude 50,000 - 70,000ft (global minimum wind speed altitude)

Platform:

Lightweight (100lbs and 75ft wingspan) very low drag (aerodynamically efficient)

Scaleable concept, platform size is essentially unlimited

Control:

Autonomy through flight control, including waypoint navigation

SATCOM enabled command and control

Payload capacity nominally 6lbs and 50W (15W night), for example:

Vis/IR imagery and real-time video to 50cm resolution from 50kft

Multi-channel comms relay - SINCGARS

Electronic Surveillance, Direction Finding

Heavier and/or more power hungry payloads can be supported with small impact on flight profile



Zephyr Programme Update



Enabling contract in place between NavAir and QinetiQ:

As of May 2009

For training, demonstration and additional platform procurement as funding is realised

System training for NavAir:

Initial funding now in place

Simulator training to begin in UK in June 2009

Flight training continues at YPG in July 2009

MOU signed between US DoD and UK MOD:

MOD loan to DoD of Zephyr platforms and GCS

Mutually beneficial open-ended joint program for:

- Training and payload assessment
- Demonstration (possibly including overseas)
- Continuing platform capability development
- Ultimately leading to Low Rate Initial Production (LRIP)



US JCTD 2008 (Joint Capability Technology Demonstration)

Flight #1

82hr flight duration

62,000ft altitude achieved

Payload assessment

Flight #2

Payload check flight at 17kft flight altitude

[Comms relayed San Diego to Phoenix](#)

Autopilot performed flawlessly both flights





Yuma Proving Ground, AZ 2008



***82hr flight duration
- unofficial world record***



62,000ft altitude achieved



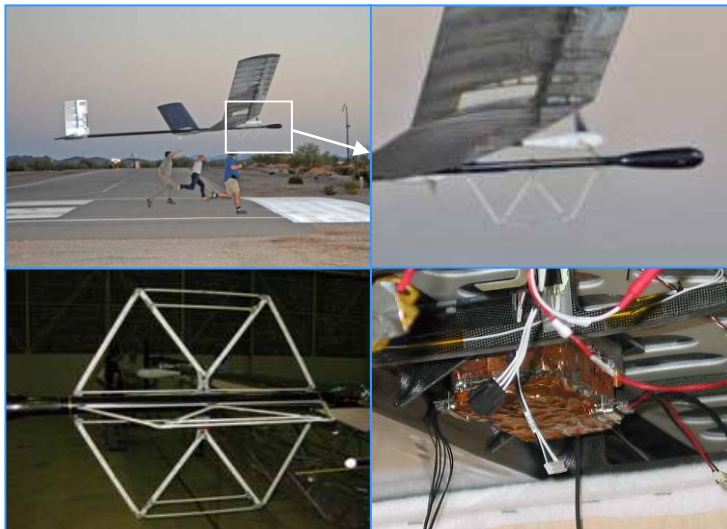
Demonstrated Communications Payloads

Summer 2006

Cross Band UHF-VHF repeater (AN/PRC-112G transceiver) used for CSAR and SF missions

Mass 1lb

Operated at a range of > 130 miles at c15-20Kft



Summer 2008

Dual channel SINCGARS VHF

Mass 6lbs

Operated at a range of > 300 miles at c17kft

Potential Zephyr Contribution to AFRICOM AOR

AFRICOM region

Large areas leading to widely distributed assets

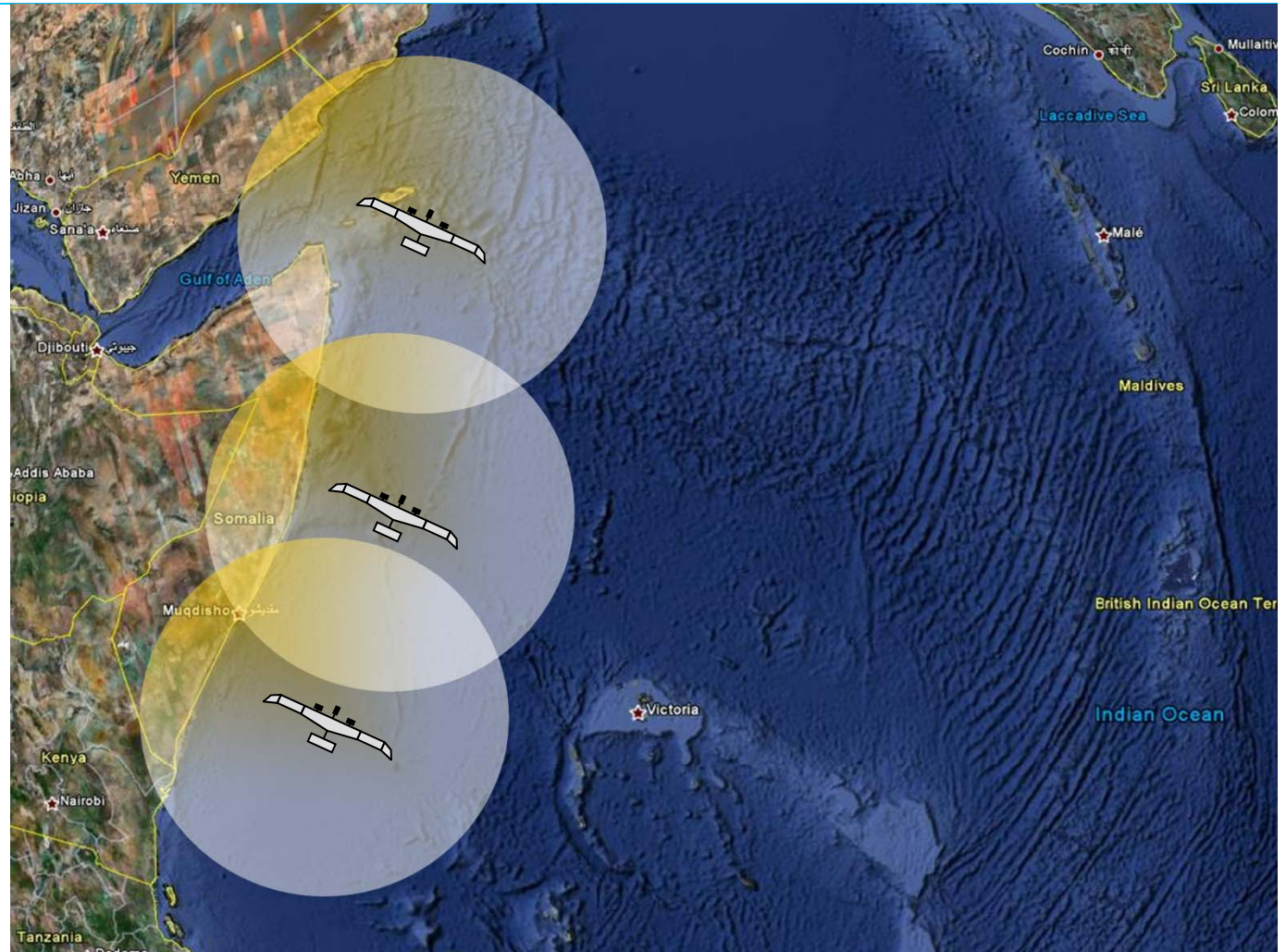
Zephyr provides constellation coverage

Low cost and low manpower footprint

Communications relay

SIGINT / ELINT

Maritime surveillance



Zephyr upgrade program

Power usage efficiency improvements

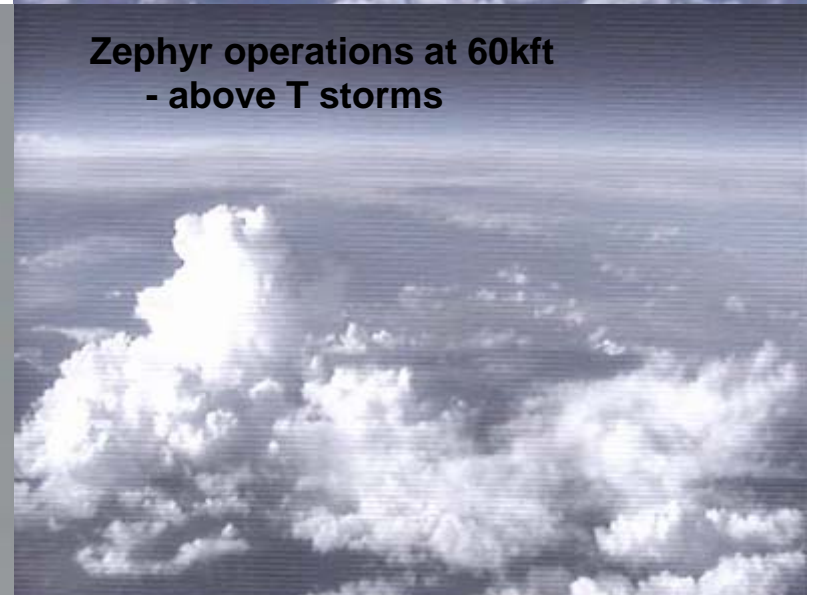
Greater payload volume

Extend flight duration to 3 months – 2010/11

Demonstrator already flying in UK



**Zephyr operations at 60kft
- above T storms**



Operating Zephyr in theatre

Ship or air transit to theater in 40ft transit container or launch strategically from out of theater

System operation (1+ Zephyr) requires 5 to launch & rota of 3 monitors

Can be managed / controlled in or out of theater via SATCOM

User defined standard ground station

6 hours pre-flight preparation from transit container (include payload fit and test)

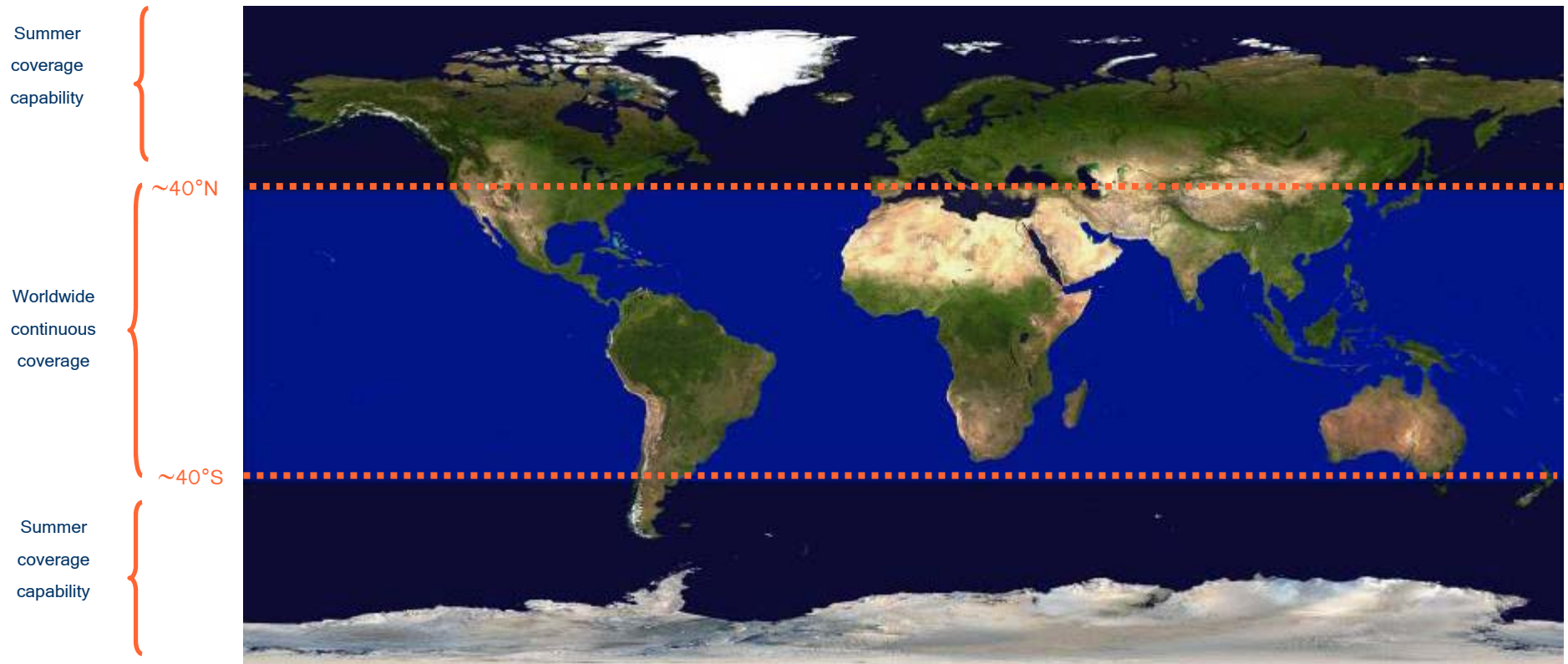
Launch site: Pre-launched and awaiting tasking

Needs flat obstacle free space 50 yards long or ship deck

Launch when it suits not when you have to

Post-flight maintenance - refurbish in the field

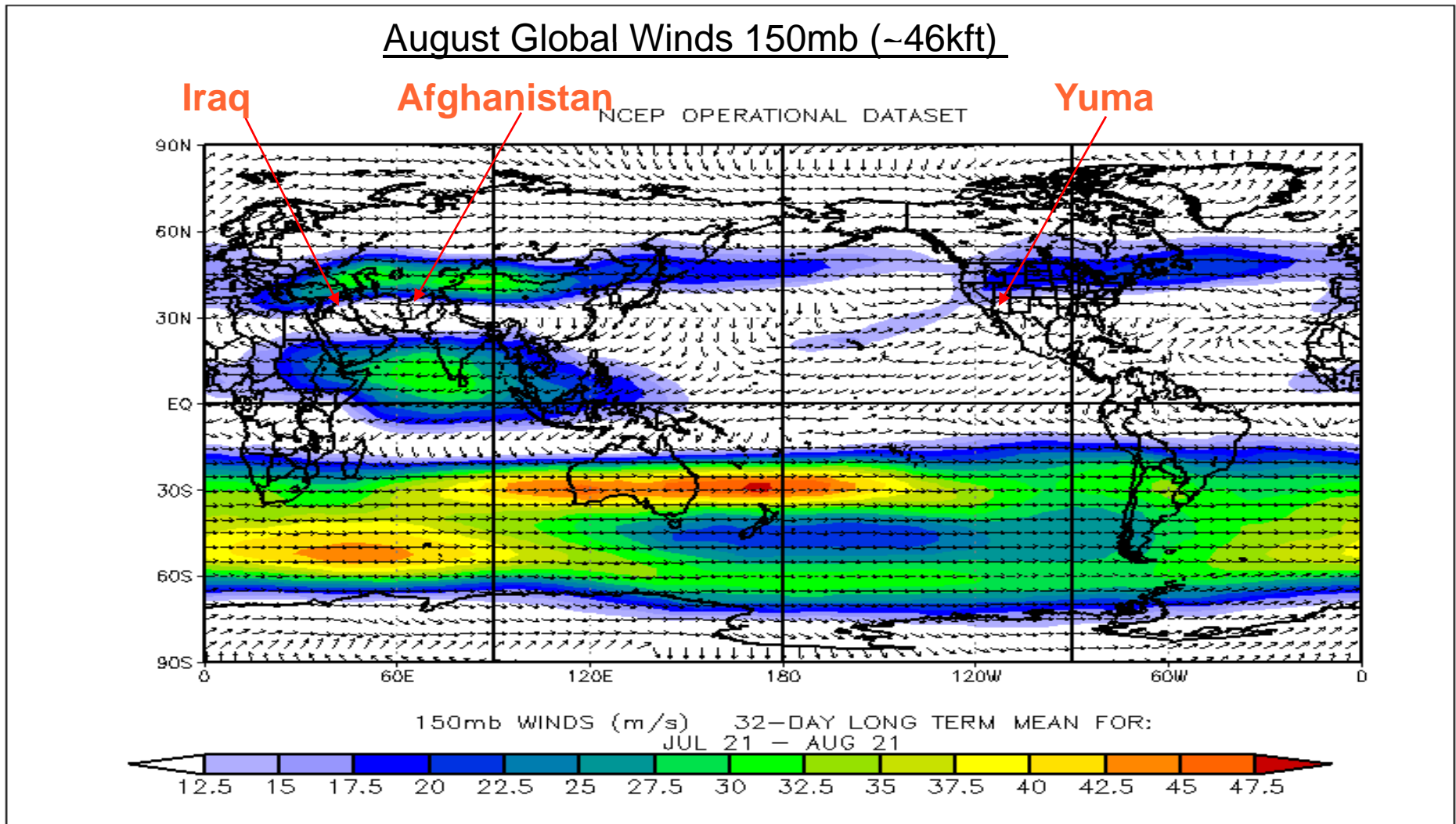
Zephyr Operations- Projected year round global coverage capability



Improvements in energy storage technology will increase latitude operations from 2010 onwards

High level weather

Back up slide



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