

GEOG457 Advanced Remote sensing

Roger Wheate wheate@unbc.ca

5-175 12.30am Tues/Thurs

Labs: Wednesday 11.30-14.30 - start next week

Remote sensing / télédétection

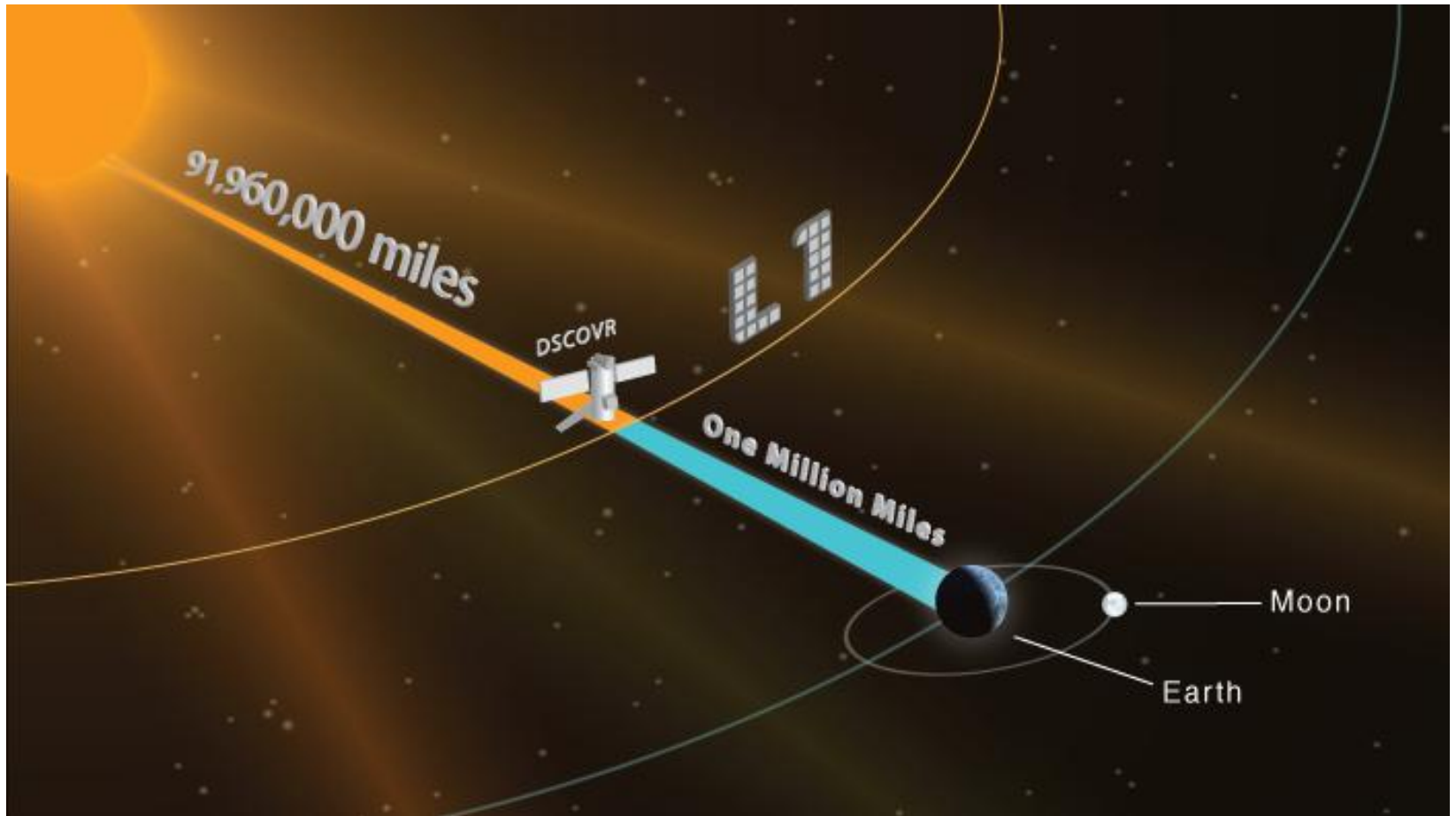
... "the science of gathering data on an object or area from a distance, as with radar or infrared photography, to observe a planetary surface."

It's a great time to study remote sensing

Why ?

- > Impact of humanity and warming
- > size of Canada - can only be seen with RS
- > Growth in geospatial technologies (inc. GIS)
- > Launch of many new satellites
e.g. Landsat 8 (2013), TanDEM, RapidEye, DSCOV

DSCOVR: Deep Space Climate Observatory



It's a big country/provinces/territories - mapping just completed at 1:50,000



Similar challenges in all northern / circumpolar countries



<http://www.snsb.se/en/Home/Space-Activities-in-Sweden/Satellites/>

GEOG457 / 657

Lecture and lab topics

- Image acquisition and fusion
- New sensors e.g. Landsat 8 OLI, Rapideye (5m), SPOT6
- Digital Elevation Models and LiDAR
- High resolution imagery (0.5 - 10 metres)
- Remote sensing / GIS software .. e.g. PCI, Idrisi
- 3D visualisation - Geowall, Image mapping, Terrain bender

Guest lectures

- Digital aerial photography and UAVs
- Planetary RS and heavenly photography
- RADAR and LiDAR
- Lectures and labs to be uploaded to gis.unbc.ca (with links)

Rapideye and the Red Edge band (5 metre resolution)

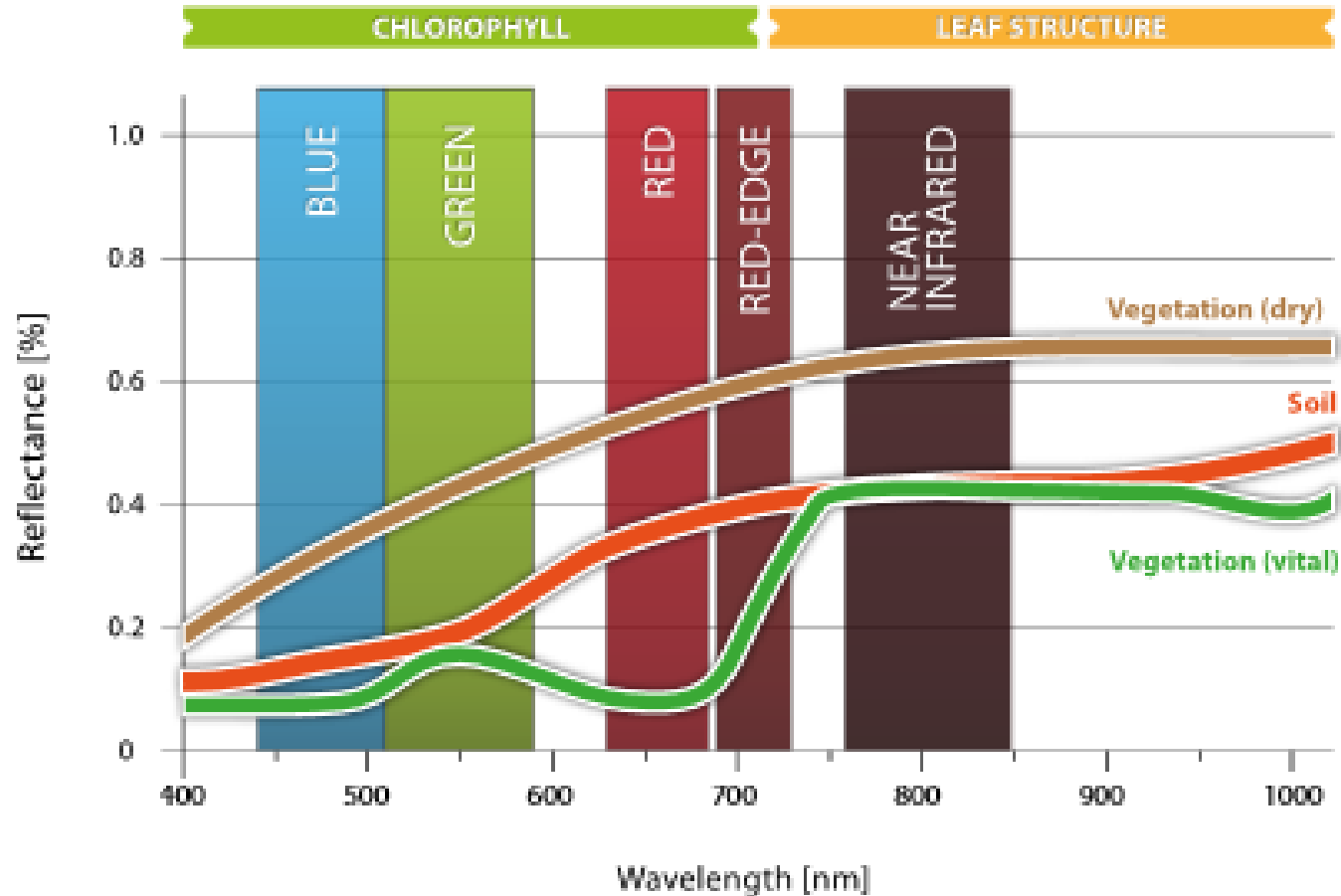
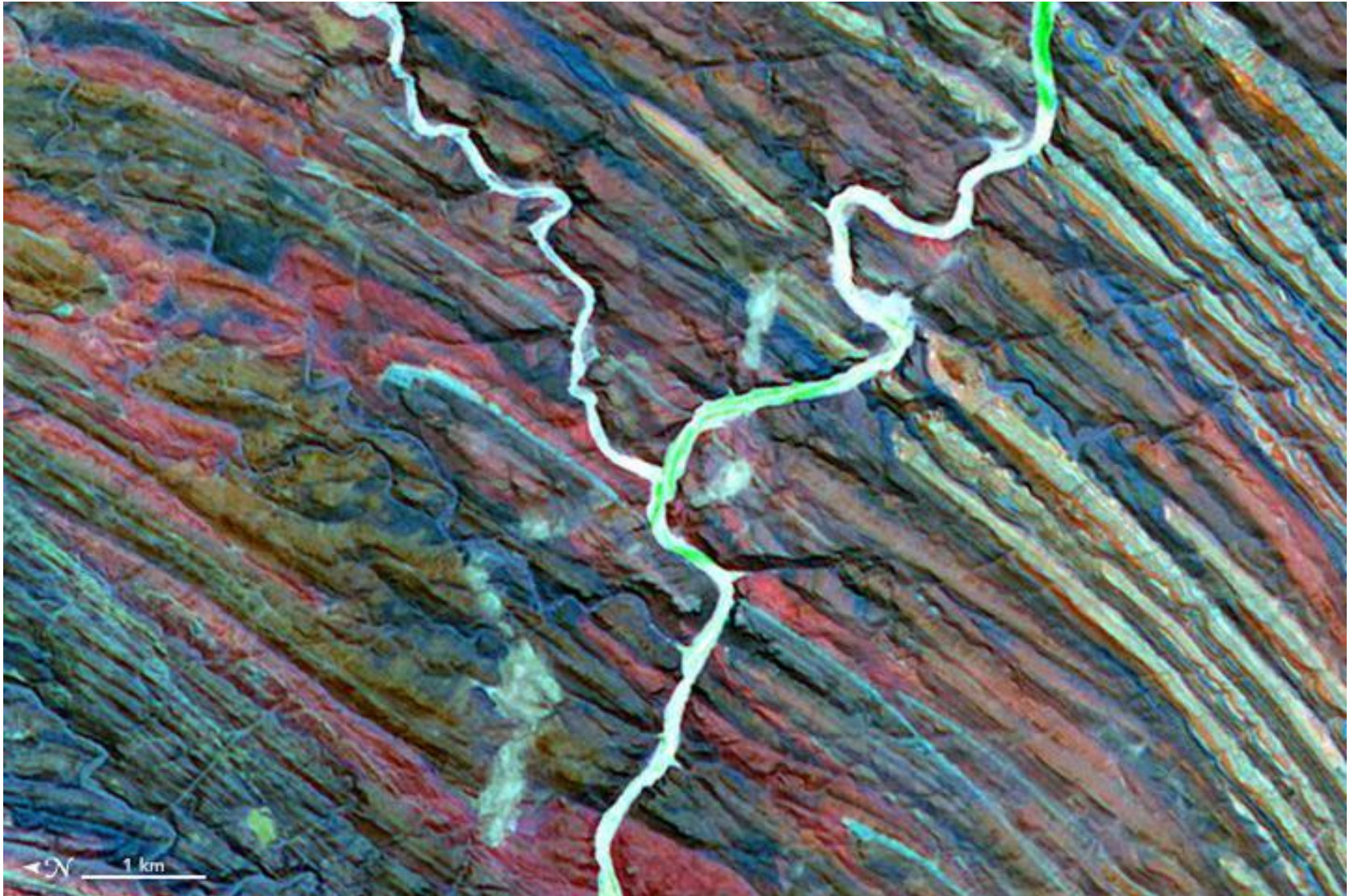
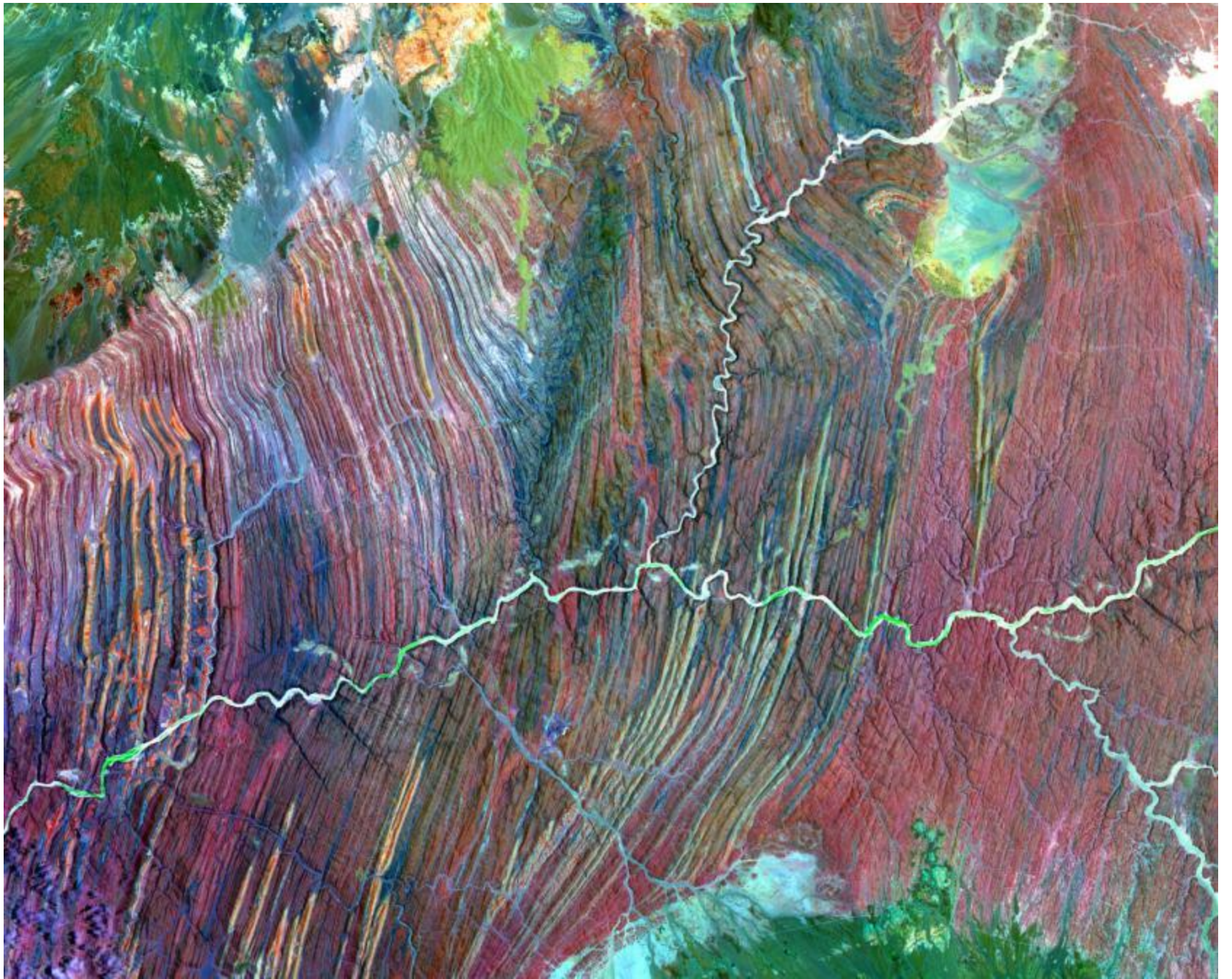


Figure 1: Typical spectral reflectance curves of selected surfaces in relation to the RapidEye spectral bands



Ugab River, Namibia



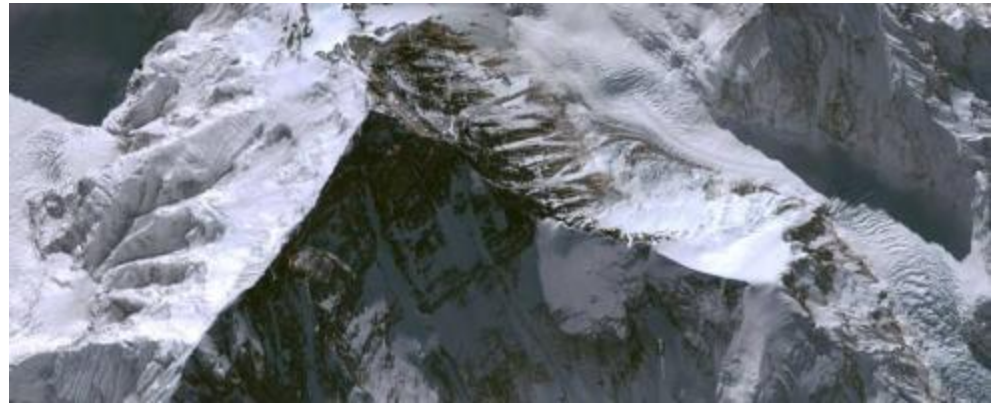
Unmanned aerial vehicles – UAVs (drones)



<http://www.drmattnolan.org/photography/2014/uav/>

(very) High resolution imagery = < 10 metres

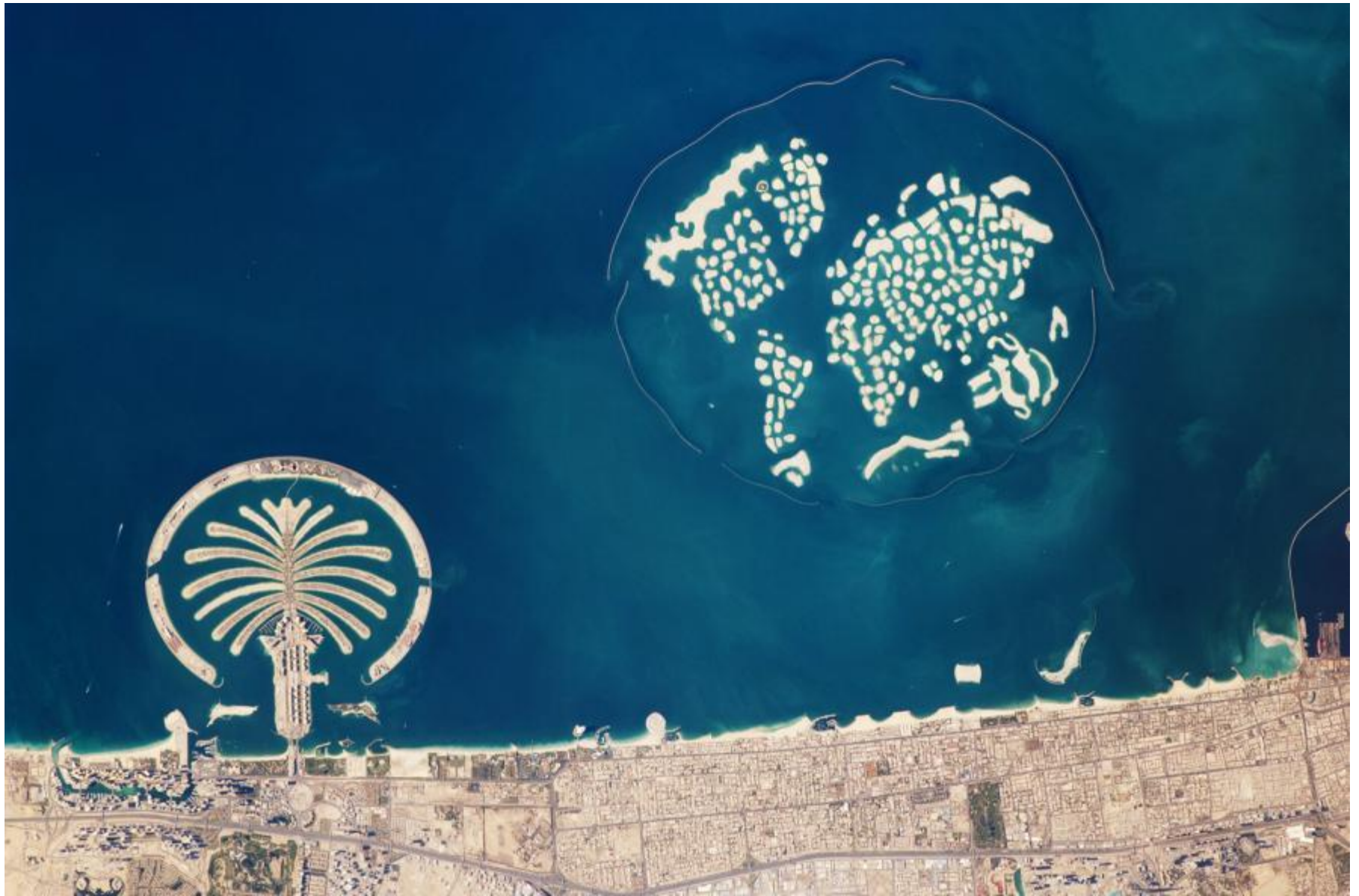
- ❖ Ikonos
- ❖ Quickbird
- ❖ GeoEye
- ❖ Worldview I
- ❖ Worldview II
- ❖ Cartosat 1 (India)
- ❖ EROS A, B (Israel)
- ❖ ALOS-PRISM
- ❖ Monitor-E (Russia)
- ❖ Korona - keyhole
- ❖ TerraSAR (Germany)



Task: research and describe one of these in a 4 slide powerpoint

MODIS Products (250m - 500m - 1km resolution)

- ❖ Surface Reflectance and albedo
- ❖ Surface Temperature (e.g. volcanoes)
- ❖ Vegetation Indexes
- ❖ Leaf Area Index (LAI)
- ❖ Fraction of Absorbed Photosynthetically Active radiation (FPAR)
- ❖ Fires/Burned Area
- ❖ Snow / Ice / Sea Ice
- ❖ Land Cover / Land Cover Change
- ❖ Daily photosynthesis (PSN)
- ❖ Net photosynthesis and primary productivity (NPP)
- ❖ Night-time imagery - urban areas



<http://earthobservatory.nasa.gov/IOTD/>

Overall evaluation

- 25% Lab exercises / assignments
Image fusion / Terrainbender / Geowall / time lapse
- 25% Class participation - presentations
High resolution / Planetary / MODIS /
- 25% Exams (10% Feb 5 and 15% Apr 7)
- 25% Project (Apr 11)

The UNBC

Geowall

'True 3D'



Thursday 12.30:
docu-video special

Intro: Levan Tiedlize

