Team projects #3

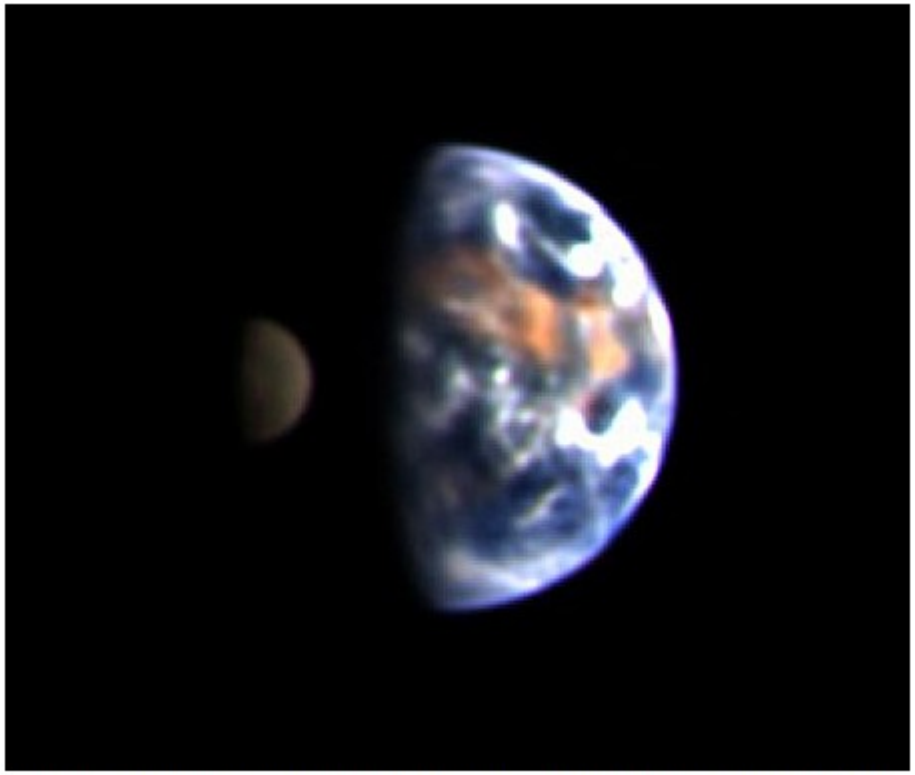
Imaging exoEarths (Visible)

yr 2035
LUVOIR telescope has imaged an exo-Earth in orbit around Tau Ceti

Water and Oxygen have been identified in the spectra

Your mission:
Design an interferometer that will image in optical light the planet's surface, identify continents, oceans, clouds

Baseline ?
Space, ground ?



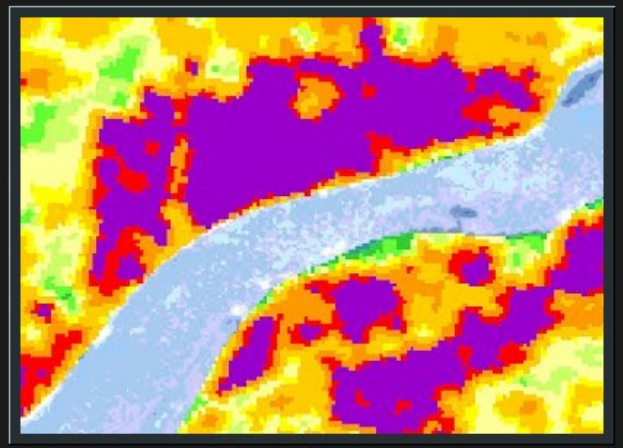
THIS EPOXI MISSION IMAGE SHOWS WHAT AN EARTH-LIKE EXOPLANET MIGHT LOOK LIKE FROM AFAR. IMAGE CREDIT: NASA/JPL-CALTECH/UMD/GSFC

Imaging exoEarths (thermal)

The next image shows the hottest place in Great Vancouver Area. Surface temperature on this site reached 41,31°C on July 17, 2004 (10:43 am).

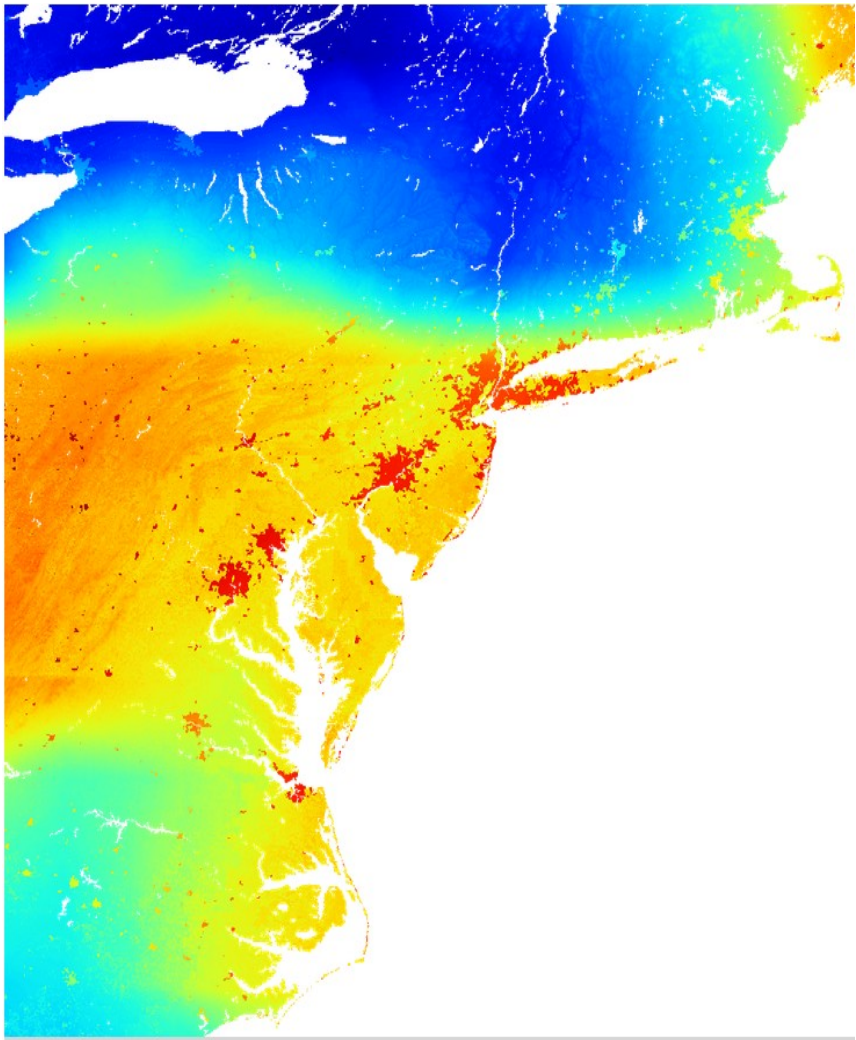
Huge parking and industrial area in Vancouver. Source : Google Earth, 2008

This image shows the same place as above seen by a thermal satellite band. The magenta color means the warmest place.



Thermal band of Landsat 5, 2004. Source : Camilo Perez Arrau, 2008

yr 2045
SETI has caught a radio signal from the exo-Earth in orbit around Tau Ceti
Your mission:
Design a large space interferometer that will image the thermal emission from planet's surface, identify civilizations (cities)



This image shows outgoing thermal radiation (watts per square meter) predicted by LIS for 2001/06/11. The urban areas stand out very distinctly against their less radiative surroundings.

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Mauna Kea interferometer

Mauna Kea has a concentration of large optical-nearIR telescope, over a few hundred meters.
Your mission: combine these telescopes as part of an interferometer aimed at imaging the nuclei of nearby galaxies

What will you need to build ? how ?
Which technologies ?