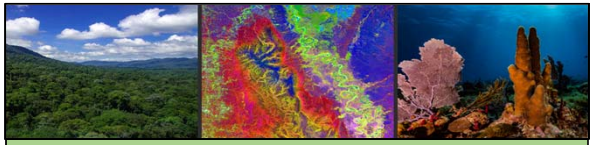
Future Use of NASA Airborne Platforms to Advance Earth Science Priorities

29 July 2020 Session 2: Land and Ecosystem Change

Center for Global Discovery and Conservation Science
Arizona State University



Science and Applications Questions
("most" and "very" important categories)

E-1 Ecosystem Structure, Function and Biodiversity

E-2 Fluxes Between Ecosystems, Atmosphere, Oceans and Solid Earth

E-3 Fluxes Within Ecosystems

Priority Measurement Objectives

E-1a: Quantify functional traits, types and composition of terrestrial and shallow aquatic vegetation and marine biomass

E-1b: Quantify the 3D structure of terrestrial vegetation and 3D distribution of marine biomass

E-1c: Quantify physiological dynamics of terrestrial and aquatic primary producers

E-2a: Quantify the fluxes of GHG globally at spatial scales of 100-500 km on a monthly basis

E-3a: Quantify the flows of energy, carbon, water, nutrients in terrestrial and marine ecosystems, by functional types.

NASEM Decadal Survey 2017

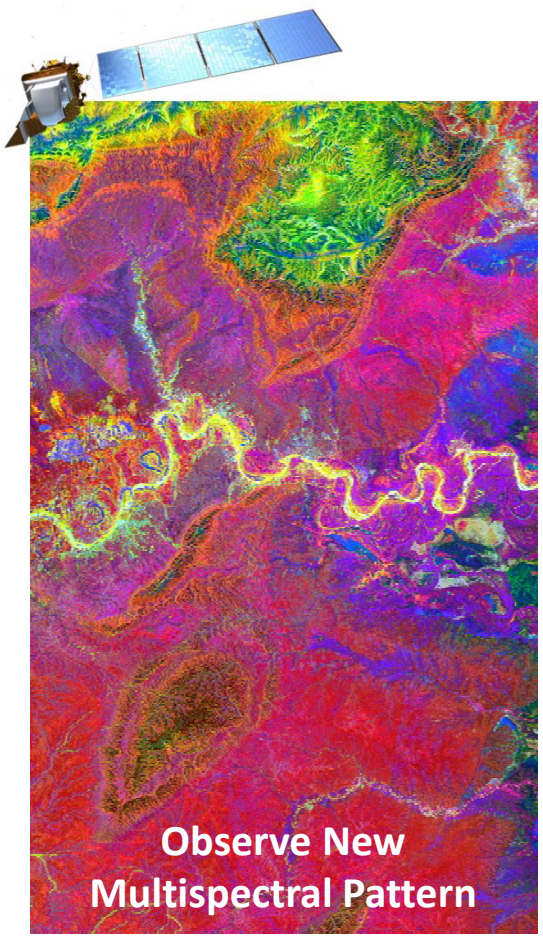
Greg Asner | ASU Center for Global Discovery and Conservation Science

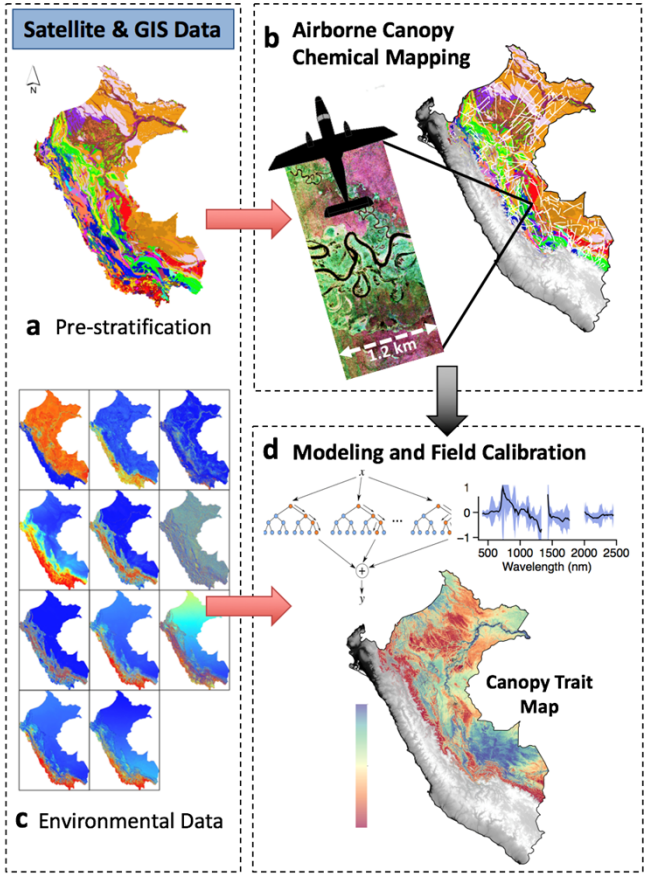
‘Top Five’ Airborne Science Roles

- Multi-scale observations for process studies
- Technology demonstrations
- Calibration/validation of space-based measurements
- Interpretation of space-based observations
- Interactive training and outreach laboratories

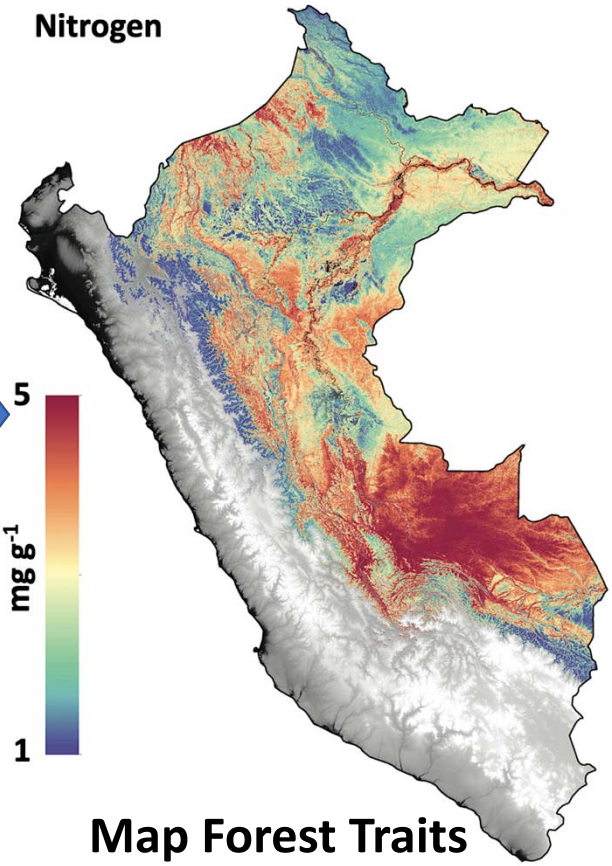
ASU Center for Global Discovery and Conservation Science
Arizona State University

Interpretation of space-based observations





Deploy Imaging Spectroscopy



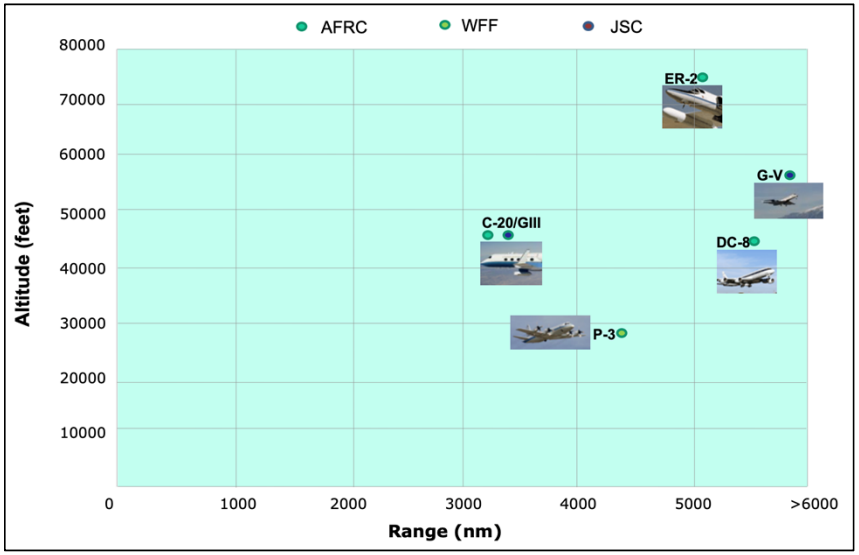
Map Forest Traits

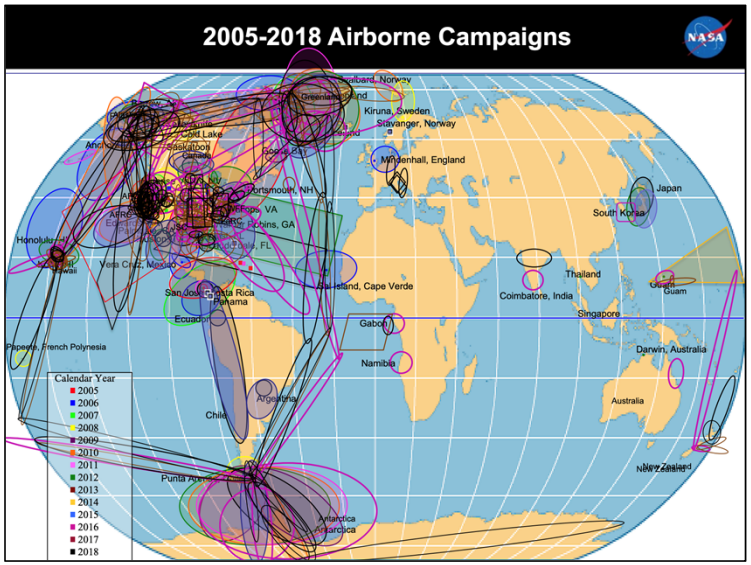
ASU Center for Global Discovery and Conservation Science
Arizona State University

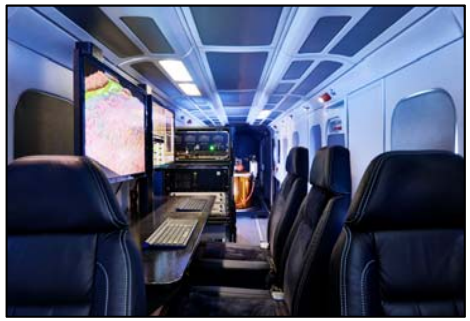
What defines a large airborne platform?

- **Aircraft size and propulsion|** DC-8, Twin Otter, …
- **Inhabited or uninhabited**
- **Payload |** single or multi-sensor…
- **Operational mission |** measurement or science laboratory
- **Daily measurement duration**
- **Altitudinal range**
- **Flight operations approach |** centralized or mobile-deployed

A narrow view…







Center for Global Discovery and Conservation Science
Arizona State University