Imaging Spectroscopy Processing Environment on the Cloud (ImgSPEC; aka GeoSPEC)

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Program: AIST-18

(please see the PowerPoint notes section below for some tips)
Problem to Solve

• Current airborne campaigns and ESAS 2017 prioritized global spaceborne imaging spectrometer
  • Large volumes (~20 TB/day) of high dimensional (>224 bands) continuous, narrowband data
  • Wide range of uses: terrestrial and aquatic ecology, hydrology, and geology

• Analysis from Level 1 to L3+ products is substantial, and may vary by biome or season

• Many users lack the expertise, resources or desire to perform all processing steps
Solution

- The ImgSPEC premise is that data distribution from SBG will differ dramatically from current approaches; specifically, in relation to the number of potential products, algorithms, and pre-processing steps.
- Rather than locking users into a specific processing flow, ImgSPEC provides on-demand, customized processing workflows:
  - Maintain provenance
  - Enable Reproducibility
  - Limit data download bottlenecks
  - **Limit scope of development of all possible SBG products**
  - **Limit costs for reprocessing an entire data set when algorithms improve**
- **Objective:** demonstrate an end-to-end, on-demand, processing platform on the cloud for imaging spectroscopy Level 1 calibrated radiance data through Level 3+ information products.
ImgSPEC is a user-centered design and prioritizes functionality based on interviews with sister AIST Biodiversity projects.
ISPEC design leverages component technologies to create a novel cloud-based science data system that enables algorithm development and custom, on-demand product generation.
Next Steps / Contributions

- We conducted a user needs assessment
- Defined project functional requirements
- Beginning defining interfaces
- Begun containerizing PGEs
- Set up our AWS environment
- First system test (default workflows) is at the end of FY20
- Publication in review at HBR on the user-centered design approach with ISPEC as the case study
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