Contents

Breakout Session #1: Needs for Change and Action

Agriculture, Food Security, and Forestry

CHAIR: Glenn Bethel
Rapporteurs: Katie Fellows and Travis Axe
Participants:
Ian
Jolyne Sanjak – Landesa (ag economist)
David Skole – Michigan State University (college of ag and natural resources)
Anthony D - Airbus
Forrest Stevens – University of Louisville (worldpop)
Stanley Wood – Gates Foundation (ag policy)
Bob Chen – Earth Institute, Columbia
Lyndon Estes – Princeton (Clark school of geography)
Sam Adam – Satellite Applications Catapult
Christian Merz – Gates Foundation
Rhiannan Price – Digital Globe
Chris Holmes - Planet
Budhendra Bhaduri – Oak Ridge National Laboratory

RAPPORTEUR TEMPLATE

Breakout Session #1: Needs for Change and Action

February 22nd, 1:15—3:15 pm

General Challenges

1. What specific challenges (technical and capacity development) exist today that can be addressed through improved open imagery access?

- Define open imagery access: has an open license (e.g. public domain, creative commons).
- Challenge: have Sentinel at 10 m and Landsat, but don't have open high [spatial] resolution imagery. Most open imagery is not currently hyper-spatial.
- Big challenge in development - lack of human capacity and [monetary] resources; in developing countries, it is difficult to survey, map, do assessments, monitor (e.g. land grabbing), etc. Imagery datasets can be incredibly helpful in developing countries and help overcome many of these challenges.
- One challenge is to use a wider set of remote sensing DATA (not imagery in the sense of visible) to do things such as soils, properties… and a second challenge is to think about the whole food system, and where imagery and remote sensing can help to better understand food security issues, which are intertwined with production and consumption.
- Helping to inform the interaction between financial aid systems with small-scale agriculture systems.

- Users are interested in snapshots. Scientists are in need of higher temporal resolution to assess change over time. How do we fill gaps when we don't have the best available data in terms of temporal and spatial resolution?
- Something available to people that is already pre-processed, ortho-rectified, with many distortions eliminated for end users (i.e. an open imagery platform creating a curated standard) – if this could achieve that, then that would unleash a wave of usage that the open part would be just as responsible for addressing.
- Some issues – giving data to users who don't understand what's going on behind the scences, such as resolution.
- Developing countries and development can gain efficiencies – in areas where it's hard to put boots on the ground. Having open archives isnt sufficient in and of itself. Need to make the openness really ACCESSIBLE. The Radiant model – has a platform that achieves accessibility.
- Only raw data is currently being stored. Open imagery will be much more useful by storing and publishing scripts/algorithms along with pre-processed images…what is being done to the data when I request it? This will eliminate a huge aggregate of individual processing times if people were to otherwise get the data and do it themselves.
- Biggest issue: access to metadata, metadata processing… Need tools.
- Development is also important – countries need to develop their own products with their own people. Applications running on the platform will be needed to help make the "openness" accessible – especially in developing countries where organizations might not have the capacity to process or understand the data.
- Education or tutorial background is needed on the platform so 'uneducated' users can use it; otherwise, access to it means nothing

2. How would you rate these challenges—urgent, near-term or long-term (5-10 years), ongoing?

    - Highest priority vote: ???

3. What specific steps could the Open Imagery Network take to advance progress in this area?

    - Need an app – less about more people using the platform.
    - Create accessibility to scripts/information to each phase of the imagery curation workflow.
    - High resolution, access to meta-data (with ability to allow for collaboration/development), access to curated workflow…
    - Education/training/communication component must exist in order to enable low-skill end users to really take advantage of the data.
    - Radiant needs to focus on user personas – thoroughly understand who might be using (imagery analyst, GIS analyst, policy makers…). How will the platform serve those different user groups?
    - The platform should have the ability to connect with existing platforms/models that end users already use.
    - Can we have ground data in addition to imagery data? Create a repository to create calibrated/captured data (ground truthing) that was derived from the open imagery.

Data Challenges

4. What specific data sets or tools do you lack to help you meet your mission requirements (imagery and GIS)?

- Lidar + high-res (< 1m)
- OSM, all multispec open imagery, derived land cover data, reference data for training/validating
- GIS/RS software platforms for app development and data: landsat class, high resolution <1m
- Workflow management tools and interoperability standards; easier access to Sentinel data and processing
- Open access to high resolution satellite data very useful, especially with policy constraints on mapping standards
- Ground data for calibration of imagery – cropland, crop/cropping system, disease incidence, yields – is such ground data included in Radiant purview?
- High res, multispectral imagery -> time series; pre-processed; fully accessible and modifiable in cloud (Africa)

- Priority data sets/tools: global database of reference/ground-truthing/validation data, and high resolution imagery.

5. Do you presently use open/unlicensed data in your work? Do you presently use licensed imagery in your work?

- Nearly full consensus that participants use open/unlicensed data in their work. Many also use licensed imagery in their work. It depends on the use case and according requirements (e.g. in terms of resolution).
- A few mentioned very little licensed imagery use.

6. What is the ratio (rough estimate) of open to unlicensed data that you use?

- 90% open, 10% licensed (multiple answers)
- Now 75% open, 25% licensed; moving toward 25% open, 75% licensed
- Landsat and sentinel – high res 100% reverse engineered from google earth
- Both – open where possible. Digital globe gbdx model also useful for ??

7. How important is temporal resolution to your application?
   - Do you require new imagery of the same geography many times per year?
   - Can you use imagery that is greater than 24 months old for much of your mission?

- Temporal resolution is somewhat important – annual is ok.
- Temporal resolution is very important in cropland to better track crop phenology and changes in crop stress (water, pest..) etc. and to track field operations.
- Temporal resolution is VERY important for some applications (productivity/crop type); 24-36 months is fine for field boundary mapping -> but one growing season, one non-growing season image needed.
- Temporal resolution is very important. Forestry requires new imagery of the same geography many times per year, but can use imagery that is greater than 24 months old.
- Yes, historical data is critical. High resolution is needed as early as possible. Access to digitalized, pre-processed orthophotos would be valuable.

8. Have you or do you see in the future need to use radar Imagery?

- Soil/hydro applications
- Radar data has additional capabilities which can be used in synergy with optical data. But often needs more user educational support to exploit the data.
- Surface Change
- Important for agriculture – not as important for forestry

9. Have you or do you see in the future need to use drone Imagery?

- YES across the board for all 3 types
- Verifying/comparison against historical aerial imagery
- Specific use cases that demand hyper-resolution [spatial, temporal]
- Closely assess/monitor cases for local productivity and family welfare outcomes
- Validation data for soil profiles, weather, yields, and crop type
- Illegal logging activities
- Precision Agriculture

10. What other data types are you using or interested in using?

- Handheld samples, including subsurface measurements
- Vector-based feature maps
- LiDAR
- Historic/digitized maps
- Validation [ground truthing] data

11. Do you use regional or global mosaics in your work?

- Both, but mostly regional for forestry and validation data.

Opportunities

12. What specific opportunities (technical and capacity development) do you see in the near-term and long-term timeframes that should be addressed through the Open Imagery Network programs?

- Storage location for data (aerial, drone, other) with non-commercial license that don't have a home. Need free web/cloud archive/hosting for anybody who has licensed imagery.
- Longer-term – how to host/back-up
- Near-term – how to handle user uploads. Do you share/send to Radiant? Or do you publish it yourself? Better sharing among users and communities is needed.
- Need to better understand the digital marketplace for this data; matching users (supply with demand).
- Offering functionality that denotes, for a specific area and time, what sensors were operating?

13. Are there specific activities that are emerging that the Open Imagery Network should follow and/or engage?

- Radiant should work with GoDan

- Willing to understand use-cases [in developing nations]. Many don't know what you can/cannot do with imagery. Understanding at what stage those use cases are in.
- Focus oon merging the technical aspects of what is already possible to unique places on the ground that don't understand how to integrate it.
- Vocabularies – use standardized vocabularies/semantics that already exist in the ag/forestry space.
- For this initiative to find it's feet (and actually be used) – first priority should be to do a big survey of all activities, put them in one place, for community to understand/digest – what is all going on in this space? Presumably already been documented by Radiant?
- Service for average user to look to see if the data they are looking for even exists – open data, vendor data… More like an open catalogue.

Policy, Capacity Development and Thought Leadership

14. The Open Imagery Network will work through other organizations that are currently serving end users (a network of network approach). Where do you go to stay up-to-date on the latest innovation, policy and research relevant to your application?

- Social media
- Africa Soil Information Service
- Geo
- NASA
- University networks
- ESRI
- IPCC, UNFCC
- Forest Investment Program
- World bank
- FAO Forestry
- WorldAid/USAID
- FIA

15. What existing organizations do you suggest we partner with to be most helpful to your community and/or application?

- Geo
- Roundtables being developed on commodities (sustainable palm)
- Certifications (FSC, etc)
- FLEGT
- Other governmental trad orgs – geo glam
- AgNet
- CIFOR
- CGIR
- SpaceNet
- USAID
- REDD
- African Development Bank
- Southern African Development Comm

Conservation and Environment

CHAIR: Matt Hansen, Professor,
Dept. of Geographical Sciences, U of MD

Rapporteurs: Jonathan Engelbert and Meghan Halabisky

Breakout Session #1: Needs for Change and Action

February 22nd, 1:15—3:15 pm

General Challenges

1. What specific challenges (technical and capacity development) exist today that can be addressed through improved open imagery access?

- Local communities and their access to data. For them, a lot of the data they have is not usable, or they do not know how to use it. Both data and analytical tools are lacking for many communities.
- Issues with internet exclusion, bandwidth for data processing and handling.
- We must identify problems from a conservation perspective.
- More information is needed from the local side, and mobile technology is one of the keys to acquiring that information
- But also, regional and global level data exchange must occur. Following the framework or the Paris Climate Change Agreement for example, the sharing of data between countries is essential for real conservation-oriented data availability. **So policy change that integrates at international level?**
- The main challenge then, perhaps is capacity. The data is often already there, but trained personnel who understand the data and how to use it is lacking.
- Lack of transparency from local governments – "conservation schemes" , where data does not always translate reality. However, many might want to use this data for less noble purposes. Security issues of open data must be thoughout and addressed ahead of time. There have been reporting cases of researchers passing along data that is misused by third parties.

- Meaningful data must be provided. Data needs to be handed off at the right scale with the right level of detail.
- The case of India: the government could not agree on a specific standard for collecting spatial data. – Standardization issues in India → open imagery initiatives could accelerate the acquisition of data and integration of standards

2. How would you rate these challenges—urgent, near-term or long-term (5-10 years), ongoing?

Urgent for all of them? Should be addressed from the start, though policy issues would be very complicated to address

3. What specific steps could the Open Imagery Network take to advance progress in this area?

- Identify the decision makers. Need a better definition of all the user groups.
- Identify user requirements. Uses differs for different groups at different levels.
- Incentivize the production of data regarding conservation - and the use of it. Data may exist, but is not used.
- Provide analytical tools that don't require a lot of training for a diverse group of end users.
- Provide multi-platform tools to engage community - with easily accessible devices like mobile for example. Some users may not easy access to a computer, but may have a cell phone.
- The data collected must be employed in a more business-oriented model, with real-time urgency, for immediate decision making (some people felt that way)
- An effort towards data integration across NGOs and individual conservation groups – like issuing alerts for example, that are available to all organizations at the same time (Radiant should support that operation)
- Perhaps more specific engagement with the media? Since the media has utilized geospatial technology so much lately, perhaps there is the opportunity for some sort of synergy between conservation agencies and the media, which would result in greater transparency and accessibility to data.
- Engage groups of practitioners (i.e. professional groups) not just users that are using this kind of technology. For example, these groups could help understand industry standards and what are actionable indices.
- Someone recommended a drone program to produce imagery for certain areas where that is not available. This is particular pertinent to small settlements – villages in secluded areas for example.
- Public awareness is important. Perhaps a public engagement component is necessary for Radiant. Need to let people know what is out there and the stories that can be told through the data.
- Radiant could contact the media to help them do better analyses and ask questions
- Radiant needs to facilitate dialog conversations between different members / users groups.

Data Challenges – many of the solutions for challenges perhaps will be better addressed by other groups. Solutions will likely not come from this.

4. What specific data sets or tools do you lack to help you meet your mission requirements (imagery and GIS)?

- Survey monkey- might be a better way to get to all the specifics of the questions listed here. We could not get to all questions.
- Mobile platform
- Low latency data.
- High resolution imagery is helpful to tell the story.
- One high resolution image is helpful even if out dated for baseline

5. Do you presently use open/unlicensed data in your work? Do you presently use licensed imagery in your work?

- About half the room use commercial data
- Abu Dhabi government buys data in a systematic basis – every two years, data for the whole country. They rely mostly on commercial providers. It's data bought separately from the military.
- In terms of conservation: how portable is commercial data? Budgets are different in different geographies. There seem to be some hot spots where commercial data is better? Some one brought up the example of Indonesia, where some protected forests are very hard/dangerous to access by surveyors on the ground. Sometimes is just necessary to tap into that kind of resource to overcome some of the challenges of lack of data.
- Linking the need for data to disasters seems to trigger commercial data accessibility

6. What is the ratio (rough estimate) of open to unlicensed data that you use?

- Did not cover

7. How important is temporal resolution to your application?
   - Very –
   - Didn't spend a lot of time talking about this section. Survey monkey- might be a better way to get to all the specifics of the questions listed here. We could not get to all questions.

Do you require new imagery of the same geography many times per year?
It depends largely.

Yes

Can you use imagery that is greater than 24 months old for much of your mission?
It depends largely on the purpose.

- In many cases, yes

8. Have you or do you see in the future need to use radar Imagery?

- Yes. Did not discuss much
- Radar imagery use must be intensified, specially to protect forests. Brazil is currently the only country allowing the use of that kind of imagery for conservation

9. Have you or do you see in the future need to use drone Imagery?

- Yes, an integrations of radar imagery and drones is needed for many geographies.
- Again the community must be instructed on how to use that data for it to be useful
- There must be a facilitation/standardization of tools to facilitate the usability of the data collected

10. What other data types are you using or interested in using?

- Didn't spend a lot of time talking about this section. Survey monkey- might be a better way to get to all the specifics of the questions listed here. We could not get to all questions.

11. Do you use regional or global mosaics in your work?

Yes, a greater accessibility to that would greatly increase productivity

Opportunities

12. What specific opportunities (technical and capacity development) do you see in the near-term and long-term timeframes that should be addressed through the Open Imagery Network programs?

- Activity in universities, particularly in engaging and integrating depts and fields of study, for the production of technology but also narratives, using, providing and acquiring data from these institutions
- Integration with different disciplines - the humanities, economics, etc.. They can help tell the story using images. Identify problems that can be answered.
- Designing/providing apps to increase accessibility and standardization, particularly for those in areas that rely on mobile technology – open source tools for a park ranger in a secluded area for example. The case of Indonesia: GIS professionals and availability of GIS tools enabled a community to have a strong case in court regarding palm oil deforestation; the community was empowered by the knowledge and accessibility to tools.
- Standardization on how to convert spatial data for conservation purposes. Need to engage with groups (like IUCN) to agree on conservation management standards.

13. Are there specific activities that are emerging that the Open Imagery Network should follow and/or engage?

- *Internet/broadband accessibility to areas that need it badly – digital inclusion*
- *Big organizations such as NASA, are planning to invest in commercial data, for imagery. NASA is planning to invest 25 million on this kind of purchase – a partnership possible, perhaps?*

Policy, Capacity Development and Thought Leadership

14. The Open Imagery Network will work through other organizations that are currently serving end users (a network of network approach). Where do you go to stay up-to-date on the latest innovation, policy and research relevant to your application?

    - There are many. Can you provide a link or curate a list? Survey monkey might be a good place.

15. What existing organizations do you suggest we partner with to be most helpful to your community and/or application?

    - A point was made about how certain organizations such as MONSANTO or UNILEVER are at times agents of change, and drive some of the progress accomplished in geospatial technology efforts
    - Universities - student and faculty researchers. Radiant could be incentivizing them to produce and handle geospatial data. Specifically, institutions with strong story-telling depts., such as humanities. Algorithm development is necessary, but much more story-telling and critical thinking around the data is needed. Moreover, the issue of man-power can be more easily addressed by tapping into university depts.
    - Radiant could work on bridging the gap in universities where there is no geospatial dept. – no faculty, Geography or GIS depts. Divisions
    - Assisting on the emergence of research communities in developing countries is a must – these are places with much less research communities, but have the most severe conservation problems.
    - Keeping track of how the implementation of broadband/internet connection is going in areas that need it. Perhaps promote the accessibility to internet in this areas.
    - CBD
    - GEOBOND
    - Offer opportunities to government officials – training centers in geospatial technology, to train already existent staff in certain areas that lack access to these resources. Implementation of these training centers could produce many new trainers and start off a GIS community in places that need more capacity.

MAIN POINTS

- Integration of NGOs and other agencies
- Training of personnel – for acquiring and handling spatial data
- Transparency across the board
- Engagement with universities to address problems of capacity
- Analytical tools – and more user friendly data – to increase accessibility and reduce the need for technical knowledge
- Integration/participation of media
- Standardization of geospatial data for conservation purposes

Discussion (raw notes):

- Does this relate to just commercial data? Drone data?
- Users may be diverse (villagers, policymakers, decisionmakers, researchers). Some may not be able to know how to ask the questions that are possible.
- Access for local communities – The format is not useable. Landsat, for example, may not be easily accessible. Need not just the raw data, but the analytical tools.
- We need to understand who are the decision makers? – Not just at the national scale – community scale, village scale.
- Needs to be in a useable form. Ex. ESRI takes a lot of training.
- What is the best scale? Different for different users.
- We need to think about the problems that we could not tackle that we can now tackle. (e.g., change detection at local scales – logging at the tree scale).
- If users (citizens) have access to maps they can map the things that interest them – sacred sites, etc.. Now they are interacting with their environment. Do not need to be literate to do so. However, a challenge may be they don't have computer access. But, may need ancillary data sources.
- Need interaction among organizations at different scales – local, regional, national. This kind of data can help.
- Sometimes there is no incentive for users to use the best data. In fact, they may be challenged when they use good data. There is incentive for not using the right data.
- Lot of people don't know what's out there. There is a lot of data out there, but it is not being used.
- Better definition of all the user groups. Uses differs for different groups at different levels. Must understand the user requirements.
- Having tools not just imagery is important
- Public awareness is important. Perhaps a public engagement component is necessary for Radiant. Need to let people know what is out there and the stories that can be told through the data.
- Support the ability to issue alerts. Some have meaning for conservation.

- Transparency is important part of conservation work. Should have specific engagement with media organization. Radiant could contact the media to help them do better analyses and ask questions. Make
- Engage groups of practitioners (i.e. professional groups) not just users that are doing these kinds of things. For example, these groups could help understand industry standards and what are actionable indices.
- High –res data is currently only available in some areas when there is an emergency / disaster. Need to link earth observation disasters to conservation actions. Need access imagery before and after disasters.
- Our community needs to become organized so that we can become a buyer of this type of imagery.
- Survey monkey- might be a better way to get to all the specifics of the questions listed here. We could not get to all questions.
- Radiant needs to facilitate dialog conversations between different members / users groups.
- How do you crowdsource common requirements? We do not know what the common requirement are. Need to engage even more with decision makers, users, user groups, practitioners, groups of practitioners. Need to empower the network of users.
- Radiant could serve as a way to increase transparency and sharing of tools across users.
- Need to engage with the citizens in meaningful ways. Not just for publicity.
- Need to mutual benefit for users and the communities of users.
- Without other contextual layers (forest concession) users (villagers) may not understand what the changes in the imagery that they see means. The workflow needs careful thinking.
- It would be great if a villager could bring in lots of data (forest dataset), high res. Imagery etc.. to make a decision. Most countries do not have much enforcement of changes.
- Policymakers don't care about pixels. Need overlay pixels with polygons – that change over time.
- Challenge of understanding - Who can do what where?
- What are the possible negative uses of high resolution imagery and how can it be used against groups (e.g. Native American groups may be worried about being taken advantage of). There may be eager users that have nefarious intentions. Must be aware of this kind of problem.
- Transparency is important, but some may be hesitant to share their data. If the data is misused it can become a political issue that would tarnish the image of the project.
- Radiant should have analytic tools to go along with the imagery. Could be basic tools that anyone could use.
- Could there be a mobile app for some users to access the imagery. Some users may not have access to a computer and may only use a mobile device. All comes back to who are the users. Can we extend the idea of who are the users (from the pope to the ranger)? They operate at different scales. Can we make this platform useable to all communities/ people not just the NGOs? Maybe it is at a fairly basic level – storytelling, maybe for some users it is more
- Number one users of Global forest watch is the media.
- There is a technical challenge of orthorectifying drone data.
- A group of users that would be interested in uploading data if it was secure and safe. May need to be a private sandbox.
- Need a marriage between users and instituitions.

- How could the conservation community attract investments and interest from commercial data providers, like the dept of defense has done? – how can the conservation community become a strong and relevant buyer of geospatial data?
- Data is not always useable form– in a way that requires less technical skills, that does not require a GIS specialist. “User friendly formats”. Data is often unusable to many who should be able to handle it.
- Drone and satellite data for secluded areas.
- Imagery is accessible – the man hours needed to make it usable is where the cost is – capacity.
- There must be a more consistent cycle of acquisition of data. A greater emphasis on acquisition strategy is necessary
- **Transparency is key**, **communities need to know what the data is for, how empowering it can be. Data must be shared equally across organizations and individuals. Policy must allow data acquisition and use.**
- Providing standards and advices on protocols to communities in handling geospatial data – but who will set those?

- Facilitate user requirements for data accessibility

- Security and legality must be ensure to make sure that people in all geogrpahies contributing to data acquisition are not breaking the law, that the data is not sensitive – revision of legal issues regarding data uploading and sharing.

Global Development

Chair: Bradley Parks, Executive Director, AidData
Rapporteurs: Olivia Hollenhorst, Rebecca Stubbs

Breakout Session #1: Needs for Change and Action

February 22nd, 1:15—3:15 pm

General Challenges

1. **What specific challenges (technical and capacity development) exist today that can be addressed through improved open imagery access?**

- Interoperability
  - Taking data from multiple sources and making it useful (metadata, standards, measurement units, schemas)
  - Need ability to correlate time and space

- Convincing public imagery is worth investment
  - Translating data (pixels) into productivity and action
  - Broad application of data that may be used in different ways (spillovers) by different organizations
  - Examples of actionable information would motivate reinvestment? Tangible numbers are needed
  - Challenging for people to understand that you can get a variety of data from satellite imagery once you buy it

- Easier to find funding for new high tech ideas
  - Realize the educational challenge involved in a tech platform that no one understands or uses
  - Creating a niche knowledge space is dangerous
  - It's also important to recognize that you don't always need the highest-resolution, newest data to answer specific research questions

- Open imagery solutions must have the people who benefit involved.
  - Getting the data to the people who would use it in a timely fashion
  - Market and data is evolving quickly
  - Built in light of well documented needs and users
  - Keep the global south in mind, and figure out

- Open data still requires human interface
  - A human needs to access and download data, which slows change analysis and distribution
- Limited capacity to understand what can be done with imagery data
  - Create methods on how imagery data can be applied to SDGS and then scaled
  - Case studies for others to use imagery
  - Built out applications using open data.

- Ethical coordination
  - Timely and complete data has higher misuse risk
  - Open data leads to stakeholders with different capacities and it creates a disparity
  - No common source of sensibility
  - Ethical guidelines of open data are needed

- Commercialization
  - In commercial sector data and analytics has not been actualized
  - Collaboration between commercial and donor communities is low

- Who pays for all of this?
  - Economic value is still poorly understood
  - Private sector initiatives are funded by public dollars
  - Open data is good for economy.
  - Governments will underinvest if economic case is not made, therefore diminishing effect of tech.

- Absolutely essential to have governance clear and ownership
  - What is the privacy, discrimination risk
  - Redress
  - If things go wrong who holds risk responsibility (i.e. no entity can sue the UN)
  - Partnerships reduce clear due process
  - Who holds the risk add to viable business decisions?

- Why would people give data for free?
  - Private providers benefit by having the public cleaning up data and providing feedback.
  - Long term investment with bigger pay off

- Data release around disaster response
  - Agencies didn't like open share license
  - Use case driven standardized license specific to use case

2. How would you rate these challenges—urgent, near-term or long-term (5-10 years), ongoing?
Note: our breakout session did not address the time component of this question.

1. Ethics of open imagery/Codes of conduct
2. Capacity of governments to understand how to use data for decisions:
3. Leverage the SDGs
4. Facilitate engagement between imagery products and users
5. Need to involve people for whom we are designing solutions (in the Global South)
6. Data interoperability (time/date/location formats)
7. Who pays for imagery from providers?
8. Diff users=diff needs. Some want more/less processed data
9. Even with lots of open data, still need individuals to access it. Need machines to be able to access
10. Access to analytical tools less challenging b/c more users-> better product:

3. What specific steps could Radiant take to advance progress in this area?

- Ethical issues-
    - Radiant offers a code of conduct for compliance?
    - Standard codes of conduct always have exceptions
    - Include inclusivity mechanism for working out hard cases/exceptions
- Radiant can be capacity builder or force multiplier as a confirmation for governments
    - Open data for different purposes and Radiant allows for that
    - Strategic planning vs analytics
    - Radiant needs to account for different users ad formats
    - Radiant acts as translator between funding agency and end user
    - Sustainable use of data.
- Radiant would help determine who can do what the best
    - Capacity to understand and be involved in making decisions
    - Decisions being made in global north for global south
    - clear list of uses that not allowed uses on platform
- User-end education
    - Radiant needs to include educational strategies early on, for all levels of users--from individual scientists to governments to understand the benefit of this data and platform

Data Challenges

4. What specific data sets or tools do you lack to help you meet your mission requirements (imagery and GIS)?
    - Terrestrial data is the challenge
        - Survey data, household data, telephone data
        - Data fusion plays into it.
    - Programmatic data and funding data
        - This is more real time
        - Geospatial as part of all data sources to be actionable.
            - Join on common unit of observation.
    - Ground truth data is necessary.
        - Things like surveys, “terrestrial data”
    - Curator Role
        - Solid data to demonstrate value
        - Curate all data? Households, health, ag…Radiant shouldn’t publish SDG data but should connect elements together
        - Radiant acts as precedent example of workflow for other users
    - Open source contract as a wiki

    - Keep it out of larger policy conversation.
- Open data, methodology, and actors involved
    - Networks of networks
    - Leverage ecosystem that is developed through interoperability.
- Data release around disaster response
    - Agencies didn't like share like license. Use case driven standardized license specific to use case. Nuances around existing licenses?

- NEEDS
    - Global mosaics and radar data interest? Yes. Accessible elevation data would also be wanted.
    - Micro weather data
    - Killer partners to build ecosystem in background. Positionally of Radiant in accordance to larger community
    - Use case- targeted intervention examples

5. Do you presently use open/unlicensed data in your work? Do you presently use licensed imagery in your work? This group did not address that question.

6. What is the ratio (rough estimate) of open to unlicensed data that you use? This group did not address that question.

7. How important is temporal resolution to your application?

- Do you require new imagery of the same geography many times per year?
- Can you use imagery that is greater than 24 months old for much of your mission?

8. Have you or do you see in the future need to use radar Imagery? Less than ⅓ of the group expressed interest.
9. Have you or do you see in the future need to use drone Imagery? Not discussed.
10. What other data types are you using or interested in using? Elevation data was brought up.
11. Do you use regional or global mosaics in your work? Most (over half) of people raised their hands.

Opportunities

12. **What specific opportunities (technical and capacity development) do you see in the near-term and long-term timeframes that should be addressed through the Open Imagery Network programs?**

- Communicate what Radiant's niche is relative to everyone else
    - Awareness building to avoid confusion
    - Make clear that Radiant is a network and guide
    - Message will be different depending on partner
    - Community building will require unique messaging approach
    - Education component and having a knowledge sharing strategy.

- What happens when core funding is gone?
    - Strategic communication to demonstrate value early on as a foundation.

13. Are there specific activities that are emerging that the Open Imagery Network should follow and/or engage?

- Liberating and consolidating datasets leads to more interest in final result than in capacity to produce result
- Match open imagery with people
    - Match making between consultants and users and providers
- Find data within bounding box interface for specific geography.

Policy, Capacity Development and Thought Leadership

14. The Open Imagery Network will work through other organizations that are currently serving end users (a network of network approach). Where do you go to stay up-to-date on the latest innovation, policy and research relevant to your application?

- Catalytic role in policy as well
    - Inform policy through use cases
    - Political and advocacy realm
    - Nimbleness and political influence.

15. What existing organizations do you suggest we partner with to be most helpful to your community and/or application?

- Global Partnership
- OGC
- Universities and academic groups (as users and producers)
- Sustainable Development through Global Partnership
    - Levels of matchmaking cascade through networks.
    -

Notes put up on the board (transcribed by Rebecca that day):

Participants were asked to vote for the top 3 cards that they thought were important for each section. Card contents and counts are represented below.

Part 2

Data types that people wanted to use:

Accessible elevation data: 4

Mosaic data: 1

Radar data: 2

Micro weather data: 2

Use-case driven standardized license for imagery data: 8

Timely terrestrial (ground-truthed) data (surveys, census, micro data, etc. including georeferenced data: 17

Can't use imagery to predict outcomes unless you measure outcomes to start with! Need ground truth data.

Combine different data sets

Traditional data community a part of radiant?

Radiant approach eases joining data types

Programmatic data, funding data, citizen data that is geocoded so to combine with imagery

Find an early application that demonstrates value- or early partner to develop app: 1

Make methods open along with data: 1

Worked example to show types of data, methods, partners, ad open contact: 1

Partnerships with positions in the larger community: 20

Figure out value added of Radiant relative to others: 5

Network of networks: connect platforms, partnerships: 3

Part 3

Key Partners:

GPSDD: 6

Developing Country universities (hard!): 1

OGC/GEO: 2

Where exercise strategic restraint:

Clearly articulate your niche, diff language w/diff audiences: 3

inform (but not lead) policy realm: 0

catalyze (but not lead) in political realm: 1

What do you do when the core funding runs out? Clearly communicate value. :0

What tech + capacity development opportunities pursue?

Strategy for knowledge sharing: 6

Cultivate demand side for open source tools: 6

Match people who would know how to use imagery w those who need it but no capacity: 6

Guide to know how to use Radiant network: 5

Use cases for different audiences: 5

Use existing commercial tools within platform: 4

Commercial marketplace tool to reveal common demands for same at a: 2

Tech platform: 0

Global Health and Humanitarian Response

CHAIR: David Stevens
Rapporteurs: Skye Naslund and Kory VanDyke

Breakout Session #1: Needs for Change and Action

February 22nd, 1:15—3:15 pm

General Challenges

1. What specific challenges (technical and capacity development) exist today that can be addressed through improved open imagery access?

- Imagery access is used less for humanitarian response, more for risk reduction
    - Ex. Assess risk as a result of climate change
- **Denominator estimation--imagery helps us estimate total population, number of houses, etc.--can't calculate the impact of a disaster without knowing the denominator (total number affected)**
    - Allows us to know that we are covering the entire area (meeting the need)
    - Need better population data
        - Is Radiant the appropriate platform for that?
        - **Should Radiant house things derived from imagery, or just imagery itself?**
            - Seems like the heart of Radiant is the imagery itself
- Most humanitarian organizations do not have the capacity to do population/spatial analysis
    - If Radiant can conduct the analysis and make findings clear (produce actionable data), many can benefit
- **There is a need for integration and improvement of discoverability of who is doing what**
    - Connect people with others who are doing complementary work
    - Prevent overlap and gaps
        - Perhaps a list of members/users and what they are doing with the information
        - AWS is hosting data in the cloud, but also want a portal where people can go in to collaborate/coordinate effort
            - Somethings more coordinated than others (ex. endemic diseases more coordinated than immediate response efforts to epidemics due to the time it takes to build collaborations)
                - GEO maybe has this?
    - It is also important to share how people are going about it
        - Sharing of techniques, methods, skills
            - Other than papers and professional meetings
- **How do we begin to do the work ahead of time (produce polygons, ground truth, etc.)?**
        - In a crisis, it is hard to do the ground truthing
        - Tunes governments to this and to importance of this
    - Produce useful maps to share with communities and allow communities to curate them
    - Allows us to see change after a disaster, not just what is there after a disaster
- Open data and open source implies open algoryths (open tools for using the data)
    - Not just the outcome of machine learning to find building, but actual mechanism for

how those buildings were found (to really understand how the data was produced)

- Really three issues:
    - Problems related to imagery during critical response
        - Imagery can make things worse without triage
        - **If an organization is not using it before an emergency, they won't use it after/during an emergency**
        - A lot of effort after an emergency, supply of imagery is good, but products coming in and not being used (mismatch between supply and demand)
        - Often imagery is limited to after the crisis--not as much data available for comparison
        - When faced with a crisis:
            - First step--how big is this?
            - Second step--what is the damage?
            - Third step--get into the specifics
    - Research and Development separate from response mechanisms
        - Prioritization needed
    - Baselining, methods problem
        - Need manhattan project sized standardization on demographic methods
        - No coordination, central funding, or consistent strategy
        - Identify the priorities and needs
        - **Adoption and absorption--need to be able to absorb things between all three of these areas**
            - Do we need another portal?
            - What are people even capable of absorbing?
                - Many orgs need processed information
                    - Ex. farmers want to know how to improve productivity--imagery helps with this, but it needs an intermediary
                - Others need raw data
                - Need to catalog the types of products different organizations need and track that
        - Need a coordinated strategy on absorption before we can scale up
- **Imagery is expensive**
    - Many organizations need higher imagery than they can afford
    - Many turn to the BMG Foundation and other funders, but they can't always provide everything--not a sustained means of getting data
        - Often go to lots of funders to mesh together datasets
- **Understanding what type of imagery is fit for what purpose**
    - Sub-meter resolution is the gold standard, but we don't always need it
- Remote/offline analytical capability
    - Processing is time consuming and takes a lot of space
    - Grantees don't always have this (space, time, money)
- Brokering access to imagery
    - MapGive--state department buys commercial imagery and makes it available
        - This could be a business model
    - Can Radiant provide a brokering function to aggregate need?
    - Should be viewed as a 3-5 year project

    - Need to work with private sector to figure out where the opportunities are for negotiation/collaboration
- Same challenges as any issue
- What can Radiant do as a game changer? Bring fundamental core geographies, authoritative, reliable, analysis ready, and tuned to answer real problems
    - Open free data isn't enough if you don't know how to use it to answer a problem
    - Fundamental base data at good resolution with some key features that are fit for purpose (but fit for many purposes)
        - Elevation, buildings, population, etc.
        - **Bringing fundamental info together**
            - Information should be flicked in preparedness phase, not response phase
- Crowdsourcing?
- Sustainability
    - No one wants to pay for it long term
    - How will we make this available ad infinitum
        - **Need a sustainable model**
            - Without it, we can flame out in a few years
            - This project needs to commit beyond the first 3-5 years because that is how long it will take to get it really going best
- Why are we doing this?
    - Hard to get governments to aggregate data
        - Need a sustained commitment
        - Takes months if not years
    - Need specific use cases
        - Disaster relief is a one off
        - Health is more ongoing
- Emergency response is so dynamic, can Radiant be the group that brokers the huge range of needs?
    - Could be the glue between different sources, methods, etc.
        - Educating people on how to use imagery is part of that role
            - **Training is important**
                - "We want to be sure that we are echoing from different perspectives the importance of training"
                - Allows us to build a wider group of end users
                - How to integrate the tools and data into different organizations
                    - Processed and actionable (information, not data)
- **What is Radiant's scope? How do we compare what they could, should and will do?**
    - **Some processes they need to lead**
    - **Need to help facilitate conferences and info sharing**
    - **Should be seeding data, brokering sharing functions**
- The vision statement uses the term "geospatial data"
- The platform overview discusses access to imagery and geospatial data, and metadata
    - difference between imagery and data
        - Can Radiant clarify what they mean? (how they distinguish the two)
- What structures are needed to mediate between commercial, non-profit, etc.?
    - Really need to dive into what problem do we need to solve
    - Is there a use case that we can use to prototype?

        - Run through the example and catalog the issues
        - Fail often and early
            - Are there response items that can be a rallying points?
            - Create a one year goal
                - Sometimes making data available in a reckless way in order to get it executed quickly, can help produce new standards
                    - Radiant has funding now, and should run with it
- What is an open raster best practices and standards?
- Radiant has weight to throw around and should
    - Take advantage of the enthusiasm around the project

2. How would you rate these challenges—urgent, near-term or long-term (5-10 years), ongoing?

- Urgent: Prevention of future risk
- Near-term: Needs a business model to aggregate needs
- On-going: Building standards, considering licensing, making data actionable

3. What specific steps could the Open Imagery Network take to advance progress in this area?

- To observe and detect what household/people have been missed from counts (allows us to know if we are meeting need post crisis)
- "Who's doing what?" and "Who needs information?" in terms of coordinating better collaboration, data sharing, etc.
- Better coordination and clear focus of needs (convoluted imagery makes things worse).
- Bringing fundamental core geographies (analysis ready).
- A pre-approval process for licensing to insure that data is being used appropriately.

Data Challenges

4. What specific data sets or tools do you lack to help you meet your mission requirements (imagery and GIS)?

- Higher resolution imagery data of specific places.
- Less expensive data.
- Imagery is fat--has excess, has another dimension because it can't be sent by email
    - Need tools to share it
    - No standardized pipeline for accessing imagery
        - **Need to work on metadata standards**
            - **Or maybe help enforce them**
            - Simplified metadata
            - Make data more findable
            - Common metadata (**simple metadata standard**)
                - With support, harvesting, and search functions
                - Needs to be practical
                    - Current standards aren't always accessible and limit the use of new technologies (drones)
                - What is the lowest common denominator on 'good enough'?
                    - Can radiant be the group that defines 'good enough'?

5. Do you presently use open/unlicensed data in your work? Do you presently use licensed imagery in your work?

- **Everyone uses both (every data you can)**
- **Most data is gray (not black or white)**
- What do we mean by open?
    - Often temporally limited
    - There are rules on sharing
    - Radiant can help by defining 'open' and helping standardize it
    - Need a clearer license for geospatial data
        - Most using creative commons license, but it wasn't designed to fit for imagery
        - Radiant can help users define an easy to understand/use licenses for geospatial data
        - Current licensing processes are too slow
            - Need pre-approval process
                - People open up when there is a disaster, but we need more of a continuous process and industry shouldn't manage it
                    - Need a mediating layer in between that can pre-approve purposes that are non-commercial so that that is not the responsibility of industry
                    - Government won't do this, they comply with a policy, but don't actually complete the feedback loop
                        - This is often true of commercial providers as well
                        - Radiant can help convene people to create that feedback loop
                        - OCHA hasn't wanted to take this leadership role on the humanitarian side
                        - We make assumptions that we are adding imagery to improve an existing process, but often there is no existing process
                            - This means that a lot of this imagery is being used for processes not intended
                            - Where are we adding to the process, where are we creating a process?
                                - Important to differentiate the two
        - Licensing agreements are often: Free public access granted, but it can't be used for monetary gain
            - Radiant can provide an architecture for this that we can use with commercial providers
        - Radiant, if not developing a new licensing, should provide some guidelines and help organizations know what to use through guidelines and recommendations
            - Open street map did something like this that is still contested and limits its use
                - Hinged on non-commercial use, but a lot of business maps are based on it

- Radiant can help solve this problem (non-commercial use)

6. What is the ratio (rough estimate) of open to unlicensed data that you use?

- Most use unlicensed data but some use licensed ("any data they can find").

7. How important is temporal resolution to your application?

- Do you require new imagery of the same geography many times per year?
  - Need ongoing data that is updated as needed
    - More for health and to set the baseline for humanitarian responses
- Can you use imagery that is greater than 24 months old for much of your mission?
  - Not for disaster relief data. Sometimes for health data, but newer imagery is often required

8. Have you or do you see in the future need to use radar Imagery?

- Need more of it.
  - A few people in the room are using it (3/17)
- It is great to be able to verify that changes have occurred elsewhere without having to physically go there.
- Lidar

9. Have you or do you see in the future need to use drone Imagery?

- A need for higher resolution and more up-to-the-minute imagery
- This is becoming a hot topic
- A few using, more dipping toes (~6/17)
- Great for high resolutions of small areas
  - **Great for addressing a known need with defined scope**
    - Ex. temporal need, 3D, multiple sensors, etc.
- Tremendous opportunity to share drone data, but even more complicated than satellite data because of the range of sensors and image capture techniques
  - Radiant doesn't need to duplicate the hosting platform of Open Areal Map
- It is important to consider drones within the broader category of "mobile mapping"--which also includes backpacks, walking through streets, etc.

10. What other data types are you using or interested in using?
- Temporal data
- Geospatial data
- Training datasets for machine learning
  - For recognizing and building feature recognition
    - SpaceNet is already trying to do that

11. Do you use regional or global mosaics in your work?

- Regional.
  - Most data is subnational and disaggregated

Opportunities

12. What specific opportunities (technical and capacity development) do you see in the near-term and long-term timeframes that should be addressed through the Open Imagery Network programs?

- To provide ongoing geospatial data that is on a need-by-need basis.
- To share drone data among groups
- Data readiness--share actionable data
- Global Indicator Framework (of the UN Statistical Division) reports on a national level, but not on a local level
    - Risk-reduction for climate change important
    - Local communities working with a larger crowdsourcing community
        - Mapping not just current risk, but future risk
        - Can we build a platform that will predict future crises?
            - CEP (Coalition for Epidemic Preparedness)--platform for responding to epidemics (diagnostics and vaccine development)
            - Radiant can help link in with other **risk mapping** and assessment to feed into networks like CEP
- Crowdsourcing--there is an opportunity for improving the actionableness of crowdsourced data (immediately following a disaster)
- Three things it will hopefully do (what funders look for):
    - More actionable
    - More cost-effective
    - Faster
        - These three issues help identify the utility of a platform/project
    - Also prioritization of efforts is important
        - Can create this in a way that each country/region/location can set its own priorities
            - Experts can come in and give a recommendation

13. Are there specific activities that are emerging that the Open Imagery Network should follow and/or engage?

- Need to be monitoring how development goals are reached
    - Need to measure the economic loss due to disasters
    - There are 230 indicators for development goals and they are growing
        - How can countries monitor their progress against MDGs, Sendai, and Climate goals
- Communication
    - Communicate the value of the data and technology
    - There may be game changers going on in the private sector
    - Radiant could integrate technology into the community
        - Consider what this technology means for policy and governments
            - National sovereignty underlies this
- **Opportunity to stabilize the market and expand the user base**

    - What is the right balance between private and public good
    - Complete open access leaves no room for private
        - **Public-private partnership**
- Should Radiant not only broker data, but software tools (photoimagery software)?
    - Should they broker access to industries, tools, etc.
    - Open source tools to publish data online--organizations and governments need to rely on service providers to host data
- Libraries that enable you to get things in and out of formats or that provide specific functions are open source (not owned or funded by a particular source)--few mechanism to keep open source products alive
    - Radiant could serve as a funder to maintain those open source platforms/libraries
- Radiant should ask some of these questions via a survey to get a wider range of responses
- It is also important to consider what Radiant should not do?

Policy, Capacity Development and Thought Leadership

14. The Open Imagery Network will work through other organizations that are currently serving end users (a network of network approach). Where do you go to stay up-to-date on the latest innovation, policy and research relevant to your application?

- Data that is specifically for public use but not to be used for monetary gain.
    - Using Creative Commons licenses
- Open Street Map.
- Open Aerial Map
- Crisis Mapper Group
- We Robotics
- Press Releases
- Conferences and Convenings
    - Like this one
    - Sat (Satellite) summit
- ESRI user conference
- Spatial Media
- **There is an opportunity for Radiant to be a conduit for that information**
    - **Need to be careful that we are considering not only what Radiant can do, but also what isn't already being done (finding the niche)**
        - Goes back to the earlier point of figuring out who is doing what where
        - May not need another source of information
        - Radiant needs to think about how it reaches its users
            - Radiant can use this list to know where it should be showing up in order to get the signals it needs from user groups to provide what is useful/needed
            - Having a list of the end points to the data would be helpful as there is no central point for this
                - HDX (humanitarian data exchange) is the best we have now, but this doesn't include a lot of commercial data

15. What existing organizations do you suggest we partner with to be most helpful to your community and/or application?

- OCHA does not want to take a leadership process in licensing data for humanitarian causes
- Everybody
- Generation long challenge--how do you harness the data and come up with a way for them to operate together
    - Data providers--as a means to bring this together
- Global south organizations
    - UN, US, Europe--easy to find those folks
    - This needs to be an early stage priority
- Economic institutions
- USGIF
    - US Geospatial Intelligence Foundation
- Facebook
- NGA
- USAID
    - We may be able to help those behind us to not make the same mistakes we did in accessing spatial data

Property Rights, Government Transparency, & Journalism

CHAIR: Peter Rabley
Rapporteurs: Jess Long, Ann Duerr

Breakout Session #1: Needs for Change and Action

February 22nd, 1:15—3:15 pm

Introduction:
Peter: This group brings together media, government transparency, and property rights

- Media is critical for what we are all doing. Independent journalism is important and we need to allow that. Give stories with trusted brand and oversight with multiple viewpoints on complicated issues.
- Government transparency and civic engagement: we work with government and collaborators, important to consider what are they doing and how are they spending "the public purse"
- Property rights: property rights are a public good; government is not being efficient when you don't have property rights. Why is it not being done? Land is extremely valuable, the government is engaged in this, and it is not always in their interest to be transparently about deals they are doing and land they have access to.
- The role of data is in shining a light on if the government is doing the right thing, being transparent, delivering land and property rights, doing so according to environmental norms, etc.
- Sunshine is the best disinfectant. How can GIS be applied to this and allow transparency.

General Challenges

1. **What specific challenges (technical and capacity development) exist today that can be addressed through improved open imagery access? Think about the challenge being that you might not know if you are a tech geek. You don't need to know.**

A. Lack of knowledge about specific imagery and how to get it
B. Enabling: providing access to imagery communities that didn't have it before.
    a. Timothy: One of the most interesting things we do is provide access of imagery to communities that didn't have it.
        - Example: After the earthquake in Nepal, they flew in and made a map. It was printed it out and taken to Kathmandu and they had people annotate. Open imagery enables this; before that, only government and aid agencies had this information.
        - One of the questions they think about is **what is the value of enabling communities to develop their own imagery**? When has it been advantageous to use UAVs vs when to take advantage of what is publicly available. No answer right now, but there are new means to provide access, either through new technology or creative uses of old technology.
C. Engaging communities is challenging
    a. **Making data available is necessary but not sufficient.** End users might not have the proper education. A nice thing about this conference is the diversity of data people vs people interacting with communities. These communities traditionally could not access data due to barriers in education and access.
D. Bottom up imagery is different from top down imagery
    a. Satellite vs balloon: satellites require a huge start up cost, but covers world evenly. Balloons have a small start up cost, but only covers a few square meters. Many people are trying to push satellite data to the local level, and locally collected data (eg balloon) is very local. What tools span stack (satellite to balloon)? If you have access to privileged information, eg satellite, you have a unique ability to open up to rest of world. Interesting framework to think about the literacy it takes to get into GIS and use it, as well as accessing vs generating their own.
E. Internet access is a common problem.
    a. If you really want to provide imagery access to small communities, internet access is a big problem. We can collect and use offline data but it's not enough. We need to find ways to connect those communities to global internet, as well as empower them through training. Need people as map makers and users, but we need to train them and find ways to channel capacity.
F. The end users who need the information may not have the right techology
    a. The last meter: those that need the information are the end users; in a lot of places there is a lack of people using technology at the smart phone and tablet level, and a lot of maps still end up on a piece of paper at the end user level, so we cannot assume access to technology.

   b. A more democratized tool is needed. It's not just open imagery, it's the media that the imagery gets delivered

G. We need to go beyond maps.
   a. Stop making maps unless you can identify who is going to use it.
   b. With geospatial, you need map as functionality but not for end user. There are a couple of interesting applications where you have the map and it's running in the background, but the actual output is an SMS alert, eg telling a farmer to turn on water. We can challenge our partners and ask if they really need the maps, and consider who has the time/resources/means to operationalize it. Much of the time the answer is we need something else.
   c. Can we make technology more available- move it down the value chain. Make open imagery low cost enough to be done with cell phones. Always that last mile of people who are overlooked and cannot have access to it. Two domains: people who are being connected and people who fall out of that box. Shrinking but not going away

H. We have a supply push rather than a demand pull. Need to create space for questions to be asked
   a. We shouldn't be developing the questions, the end user should be, what we come up with might be not what they need. Radiant should build the capacity that allows the end user to know what questions to ask, so they can then ask for what they really want/need. How to we make tools most useful for them?

I. Discoverability: what is available and legally how can you use it.
   a. Who is the level of beneficiary that Radiant should focus on? Are we focused on the providing service for the end user, and who are they? Is it the person with the smart phone? Some data is very hard to find, we lack access because it's remote, and sometimes it is hard to figure out how a community can use the data but they are nonetheless impacted by it (eg, if land is being stolen). Most interesting things is discoverability. Finding things that we don't know who created the image: what is available and legally how can you use it- one of the biggest challenges.

J. Transparency vs accountability
   a. Going from this concept of transparency to accountability: question of ownership of revenues and contracts to make that more available to people trying to hold their government accountable. Who is the end user, do they have the capacity, and how can you make people listen?
   b. Who needs to hear about issues and how should we make them care? Hard to think of a practical way to make this useful. Who is going to use it? The end user may like to know about it, but who is the NGO and independent people who will publish this so there is pressure. Example: a recent story where small farmers were found to be responsible for the problem. We always think it's the big industry that is creating the problem, but here its small farmers. So if we publish, how do we return it to the people responsible.

Concluding remark: We cannot solve every use case, what can we do that to provide the information so that those with each use case can use it. The problem is lack of metadata, etc. and we need to focus on that.

3. What specific steps could the Open Imagery Network take to advance progress in this area?

Is about lowering a platform so more end users have access to data?

A. Identifying the user is important: How far down the stack are they trying to go? Highly educated people in this room? Empowering tech sufficient organizations, community groups not technically sufficient, or down to citizens? Each group needs a different design.
B. Exposure of project: How do you engage the community? Community will undoubtedly expand. Sometimes want an API, sometimes a discover widget.
C. Hiring Designers: Nonprofits aren't good at that. The more you can make it feel like a consumer experience with the end user in mind, more you can use it. Amazon web for example has whole gambit from handholding to tech.
D. Be an enabler rather than focusing on each narrow use case:
    a. Develop best practices and lessons learned: E.g. almost every government has aerial imagery, but sometimes they don't want to share it. Good use of resource would be to get people to share what they have. Best practices, lesson learned about what worked and what didn't work in developing countries. Point out and not just say that it's good, but have facts to back up why sharing imagery is good.
    b. Enabling data sharing: There is reluctance to share data; they don't understand the implications, be it security or value, etc. Show the best use cases to make the data available. They are often reluctant even if you get rid of the tech barrier- need to show that security concerns are not the case.
        i. Make sure data shared is not into a propriety state, but using open tools and open data.
    c. Technical aspect:
        i. It's pretty hard to share through your own server, so tech aspect is also important. Digital globe, for example, has massive amounts of data, most NGOs would never be able to do anything with it because they don't have tools to run analytics or even design algorithm.
        ii. We are a long way away from democratizing because they have many barriers to doing that. Radiant can lower the bar to making data more available; give us a sandbox and a set of tools that we can make use of the data.
        iii. Take the time to figure out who the players are, what they do, who the community is, would help make use of a fast changing industry. Define the community of users.
        iv. Could see cherry-picking of good tools- storymapping with ESRI, for example- tools that work in the space being adopted.
    d. Caution: Radiant should not try to target consumers- scope creep. Even within specialists there are all types of users. Recognizing the diversity of the people who could use this and what their endpoint might be.
E. Ethical considerations:
    a. What data do you share? Radiant would want to pay attention- what does a license mean, what are restrictions.
    b. Partially open data: Perhaps data from the balloon needs to be private, vs satellite data that does not. It is difficult to control and sometimes you are bound by international law.

Possible solution is allowing partially open data. Consider who owns the data; we are not trying to take it, we are trying to enable use of their data.

c. Rights based approach: Identified 5 human rights related to drone data collection. Important to consider what rights people have and ethical implications. Puts the onus on Radiant to make it clear how data will be used and what protections will be. Educate end users and make people feel comfortable about what they are doing with their data.
d. Demographically identifiable data: can be found using mosaic approaches. How do you protect people from that?
e. Learn from others: Radiant should get ahead of the curve, anticipate ethical questions, and learn from what others, such as humanitarian/nonprofits.

F. Focus on government data first: data is difficult to access for research. Individual drone data may be useful, but secondary.
G. Cannot restrict who can upload data. Need to build in checks to change Radiant as the field changes. "With great resolution comes great responsibility".
H. Accountability and relationship to transparency: E.g. if you have situation where people are interacting with a government, and you are asking the party that you think is culpable for the data that would hold them accountable.
    a. Radiant cannot act as a censor
I. Allow for new ideas: enable specific use cases that you're interested in, but allow for ones you haven't thought of yet. If you look at OpenStreetMap, they didn't know what people would do with them. Allowing people to figure out how to get in.

Data Challenges

4. What specific data sets or tools do you lack to help you meet your mission requirements (imagery and GIS)?

Do you lack tools for what your mission is? Are there tools you don't have access to?
Lack Data- 80%
Lack Tools- 50%

What are the top data sets you are lacking?

- higher spatial resolution imagery.
- Temporal aspect is important, particularly historic, pre 2008. Need to go back in time.

Anyone need data updated every week or month?
5/19 need this, and only for specific applications like refugees

5. Do you presently use open/unlicensed data in your work? Do you presently use licensed imagery in your work?

Yes: Almost everyone. What kinds?

- google earth

- digital globe
- base layer data: a lot is available at no cost
- state government data.

6. What is the ratio (rough estimate) of open to unlicensed data that you use?

Only about 5 buy datasets

Note: all data is licensed

7. How important is temporal resolution to your application?

- Do you require new imagery of the same geography many times per year?
- Can you use imagery that is greater than 24 months old for much of your mission?

Very important! Everyone uses it

- E.g. In this year, this law happened, and now you need image from before.
- Change detection, before and after. Looking at things like food security, disaster response, urban development
- Property rights- see the image before the disaster. Also rights violations- particularly isolated regions. By the time you know about it, have to go back weeks or years to figure out what and when happened.
- Often ask for time series data.

8. Have you or do you see in the future need to use radar Imagery?

Many did not know what radar imagery is

- Radar imagery- allows for penetrating cloud, can be mounted on an airplane or drone, and penetrates clouds, tree cover.
- The number who know how to interpret are few, need training and use of algorithms. You can't just throw it out there and expect people to use it
    - Disagreement on this point. People learn quick and adapt.

May be useful but we haven't thought about it. If we put it on the platform, people might learn about it and find ways to use it.

- Addresses the fundamental question- what are they going to put on the platform? If you are just uploading a bunch of stuff, and we don't know how to use it? Often NGOs are not technically sophisticated. Providing training on the platform would be a great service.
    - Agreement on this point: it would be very useful to provide training such as imagery interpretation, and in how to use available tools.

9. Have you or do you see in the future need to use drone Imagery?

Current use drones: 80%

1 future drone user.
Almost everyone would have a use for drone imagery.

Comment: sometimes we use drones as a shortcut because they don't have access to satellites. Maybe wouldn't use drones if they did.

10. What other data types are you using or interested in using?

- Lidar
    - Comment: with both lidar and drone, you have an issue of fat data. Tools to use data and get it out would be helpful.
- Elevation data/ topography. Elevation is critical for modeling and interpreting how different elements may behave, e.g. rain runoff and flooding.
- Standardized protocol for ground data/ Citizen science data
- Multispectral- infrared, thermal- for pollutants, water, etc.- not available at good resolution anywhere.
- Question about Radiant's relationship with derived data. Wants to focus more on enabling others.

11. Do you use regional or global mosaics in your work?

    How many people use base maps? - everyone.
    Is there a regional focus or do you need the whole globe? - Disperse geography that is needed.

Opportunities

12. What specific opportunities (technical and capacity development) do you see in the near-term and long-term timeframes that should be addressed through the Open Imagery Network programs?

What should radiant absolutely do?

- Community standards exist, they should be improved and amplified. Need to speak same language around discoverability of data.

- Ability to share in creative ways what we create on the platform. Many ways to publish data, if there are worthwhile tools to help makes it more valuable.

- Open source tools that everyone can contribute to. These exist that are somewhat maintained, and everyone uses them, but doesn't get as much love as it could.

    - Which tools? QGIS earth observation for example.
    - Derived data or not- enable people to derive data themselves.
    - Derived data could reside there, make tools available to derive the data, then maybe post it.

- Communication- getting feedback on how to do that without reinventing the wheel. A newsletter? Something else?

    - Instead of newsletter, place where people share their learning. People can post data, questions, information, etc. facilitate community, learn from each other.
- Toolbox- give feedback about what they can work on that would help with tools.

- Scoring or ranking of data- no metadata, you get a zero.

- Education: If you are going to be a one stop shop, there needs to be an upfront element that educates on what satellite data is. Lots of people in the NGO world use imagery without knowing how it functions. Incumbent responsibility to make sure that everyone has a good understanding of the product.

- Facilitate data sharing: Would also be cool in areas where there is no data available, ways to share data with other people.
- Community aspect: Smaller NGOs have specialized needs for images, tools, etc.- having a community aspect where you could identify other people with similar needs would be interesting.

- Targeting: Bring together these ideas—maybe you want to invest in those who are becoming users, and target them with open online courses and educational needs. Not necessarily target the experts, but the young people/early career.

- Partner with academic institutions: what about if academic institutions do the education with support from Radiant. Hybrid models. Helping to fill the gap.

Points:

- not just about data and learning, but also knowing what is available.

- There is a lot to be gained from sharing tools, making them open tools. But caution about OPEN SOURCE. It's not all open source—open models and open tools, but open source is more dangerous.

- Radiant wants it to be at no cost, but it could still use proprietary tools.

- Sandbox idea- a unique place where a lot of tools are available spanning needs/users. Could upload code snippet on one stack of images, could see what script did as you browse. That could be really interesting. Something immediate about being able to see what code does in a testable way. Allows people to modify peoples work.

- Important to empower NGOs at the individual level.

- Evaluation: need to measure what is the impact of tools. Need to consider the evaluation component.

- A "free" zone: Try to identify areas of the world that are open for use by Radiant community. Something in a desert or forest, people can try out algorithms, not disadvantageous for the commercials.

- Easily searchable. If it's supposed to ingest various datasets and cater to a non-expert, people should be able to search. Seems obvious but often gets lost.

Policy, Capacity Development and Thought Leadership

14. The Open Imagery Network will work through other organizations that are currently serving end users (a network of network approach). Where do you go to stay up-to-date on the latest innovation, policy and research relevant to your application?

Top resources that you use to find imagery?

- OpenStreetMap: informal network based,
- Within your own institution: World Bank is creating their own database
- Darmus Flood observatory
- National space agency in Brazil
- Earth Engine
- Landsat
- Digital Globe
- Apollo mapping: search function/image hunter tool, can access Airbus, Digital Globe, lots of different options
- HDX for disaster response
- Geoportal open source catalog

15. What existing organizations do you suggest we partner with to be most helpful to your community and/or application?

Top two places that you go to- what works and what doesn't

Peter: please sent to Anthony the top two places that you go to, what works and what doesn't. Organizations that you think are not represented in the room and should be included in the community.

Open discussion:

Opportunity: ability to pull in data from the corporate sector. Some people do have a lot of data that is scrubbed. Could radiant do that as a service?

How? Put it in one place, special deals for particular industry, aggregate, keep it fresh and maintained. Would it be in business interest to do it? Could be.

Central registry; share what is created on the platform

Huge challenge for security. Huge part of what ESRI does is allowing for sharing internally and externally. It's not open data, and therefore there is a huge amount of work that goes into making sure only the correct people have access. Huge challenges involved. One solution that is used is create a subset that is

publicly available. Know the boundaries of the house, but not what's in it. There's a lot that could be done to make sure that things that are open to the public are known.

Open algorithm: Idea that you need to share data to use it. Share an algorithm instead of data. This is a piece of land, all I need to know is if it changed. Don't need the imagery. Module based algorithms. You just get the results of the algorithm, not the imagery. Can expose what you need without access to the imagery.

Transparency aspect: journalists. Whole group of new data journalists. Interesting end users that you can facilitate.

Open contracts: OCDS standard- have standardized discoverable data so that it isn't just printed PDFs that count as open data. Radiant could look at this as far as open standards.

On the imagery aspect: lots of imagery data without metadata. A lot could be done to provide metadata to images. Trying to balance too little vs too much metadata.

Enabling other users: journalists, policy people etc.- even if it is a reduced set of tools, but allow data available to interface with.

Global forest watch: project to map world forest. Useful but you're beholden to them, so you have to wait for them to provide. Now they are getting to a temporal level of granularity where it is actually useful. They spent a huge amount of time to develop algorithm. It would be great to have a tool where you can run the tool in your little area without knowing much about it. There would probably be many tools like this that would be useful for a lot of people, including journalists. Doing it now, but they are specialists- data journalists.

Scope creep- what is the level of knowledge you need to go in and use. If there is a tool that allows you to zoom in and use basic functionality. There would be a benefit of something this simple for an end user that does not have any special skill.

If you lower the entry bar, you could learn things. Make the tool more accessible to get more people playing with this abundant data to start asking questions we haven't thought about yet.

Compendium of tools that would be desired.

Breakout Session #2: Advancing the Open Imagery Technology Platform

Data Providers

Chair: Kass Green (kassgreen@earthlink.net)
Rapporteurs: Katie Fellows and Jonathan Engelbert

Participants: Kass Green, Glenn Bethel (USDA), Bruce Wald (Hexagon), Christoph Aubrecht (European Space Agency rep at World Bank), Andrew Schroeder (WeRobotics), Chris Herwig (Google), Jed Sundwall (Amazon Web Services), Ellen Goodwin (NOMA), Lawrence Friedl (NASA), Anthony D (Airbus), Barbara Ryan (The Group of Earth Observations), Rhiannan Price (Digital Globe), Matt O'Connell (??)

RAPPORTEUR TEMPLATE

Breakout Session #2: Advancing the Open Imagery Technology Platform

February 23rd, 11:00—12:30 pm

QUESTION 1: While OIN's focus will be first and foremost on the Global Development Community (GDC), it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for us to grow the user base as it relates to the platform?

- Google: When we say 'global development community' – who are the users? This seems to be a primary goal of Radiant, but it appears to be huge.
- Development is in terms of poverty. World Bank, the foundations, NGOs…
- USDA: it's about the lagging community, the have-nots of geospatial (i.e. not NASA). Goals need to be more primitive.
- Amazon: Radiant isn't going to develop the tools, but they need to be created. Some might share those tools, but they won't be required to.
- Airbus: Where Radiant can really make a difference - make data easy to use. This might mean you have to add tutorials, education material, case examples, simple APIs, etc. to enable new user community to access data and tools.
- WeRobotics: designing for that community is an inherent problem unless you go for lowest common denominator – there is a much broader lift that can be done for non-profits, etc that don't have access to this data, that can come up with solutions for problems if they…
- WeRobotics: consultancy function is really interesting. Don't need more tools per say, or more data – need more people to get involved (smart people that know how to frame/manage a project). On the other hand, seems to be a really expensive services model. If Radiant is doint the work, I don't see how that's going to happen.
- Airbus: Perhaps people can provide some support to Radiant – other ways we can contribute. From industry side, we already have lots of material already prepared (e.g. tutorials) that we could contribute.
- Lots of consensus on education, and classes. Many already exist.
- WeRobotics: To the point of other things that could be contributed besides data, take the humanitarian toolbox for example. Things lacking – project management, take seed of idea and move it along. Hum toolbox was supposed to allow people to volunteer skills for limited amount of time and move projects along through development process.

- Matt: maybe an enabler could be a connector. Is Radiant going to host or provide links? Who are the users? As an adventure capitalist, they don't have their go to market strategy right. Who are your users, what do they want, and how are you going to do it?
- The market is broken, and Radiant can play a role in making the market more transparent.
- Radiant can help connect people with skills, information, and data, and the will to solve problems. Connect the dots.

QUESTION 2: What would you as a data provider, suggest be built into the platform that addresses GDC desires and concerns, while empowering data providers to plug into the platform at the back end?

- What would make you want to work with Radiant? Airbus: Money – balance between commercial paying customers and free data; mutual benefit for all involved; in an era of changing tech and business models – have to address how we work with new business models; Radiant and open access will help steer those business models
- Create an easier to use interface. There's a lot of ancillary data that Radiant isn't interested in storing/using, but it could help these downstream services – needs to be worked out.
- Toolbox – what's in it (for laymen) and who is the audience? Enabling it – K-12 (bringing it down to that level) or to what level?
- 'Commercial users' – will this create a competitor in some form? Needs further explanation.
- RE business models – Hexagon feedback – have done lots (it all), but self-conflicted with a lot of their users. Interested in playing, but not sure how to do it. Struggle with the commercial user. Petabytes of data – walk before you run – better way to set themselves up for success – smaller bites.
- Cause marketing – get visibility (need, because nobody knows about you) – which then helps with regulatory – which then helps with brand name (because you look like a good person). You then grow the market. As data becomes commoditized, people are more and more interested in the solutions. By giving data to people, these groups can then give answers, because people don't want data, they want answers. You get customers. Three points: get visibility, grow the brand name, and then get customers.
- DigitalGlobe: business model good – freemium model; there are multiple lenses in which we can tackle this. For DigGlobe – things like disaster response, its easy to make free and open. Radiant needs to address licensing structure they want to adopt sooner rather than later. Can understand why you would want to make it completely public. Do investors want to support this forever? Grants, user contribution, business model for sustainability? If there is a commercial aspect, good for longevity, but does add some barrier. There are creative ways to engage – such as sponsor open data – development friendly licensing; want to enable research, and then those people can contribute their algorithms. Will get more buy in when companies see opportunities for profits or recognition. Bill Gates – we can end poverty in the 20th century if we….

- Airbus: open/non-licensed – there is an assumption it is free. An early key thing Radiant has to do is define what Radiant means by those terms. People have different understanding/definitions of those terms. A starting point is for people to understand and agree on definitions of those phrases (license terms, usage…etc), so people know what they are agreeing to.
- Airbus: Radiants primary focus is on global development community – what we have to be mindful of, is once that platform is there, anyone can access and use it – nothing to stop commercial companies from coming along to use for commercial purposes.
- Bruce Wald: there is a commercial aspect. They would have a right to claim unearned revenue or margin if even it came through a Radiant platform. Practical aspect; not saying it can't be overcome.
- WeRobotics: is Radiant supposed to ?? Or is the intent of open to be open to anybody and Radiant doesn't want to do the gatekeeper function? From an NGO point of view, have wanted a mediary so don't have to go to a bunch of companies, would be nice if somebody brokered that. It's striking that Radiant doesn't say that the opportunity here is to contribute to solutions to major global problems. The headline instead is 'how do I get recognition and visibility'.
- USDA: the opportunity isn't to be a gate keeper. But for this group, you have to be a gate keeper, and have proper license information. License is not consistent by company – Radiant needs to control this access, and partially this commercial part…
- Amazon: Theres a lot of energy and excitement around Radiant – they're in a position to throw their weight around, especially around this issue of licensing. The idea to have Radiant act as this broker is compelling.
- DG: the funders need to come together to do this.
- Google: getting confused. Improve regulatory licensing – yes! Everything about the platform – do you have a staff of 100 engineers? 3 years funding, ok. Most of this is already done by sustainable companies.
- Overview was really confusing for most.
- Data already exists in various clouds. Why not just build the links to it, rather than start moving data around.
- Make imagery more accessible by making it more discoverable, as well as making the licensing issue better.
- There is value in hosting some data. Especially RE drones. Is it reasonable to expect those that get that data to host it forever? People that can't buy cloud storage, it's good for that type of data.

- What are some of pain points that drone imagery practitioner's face as it relates to, upload, initial processing, storage and analysis that the OIN platform maybe able to alleviate?
- What open source or commercial tools would you like to connect to in order to process your drone imagery?
- Obviously, OIN will not be able to store all the drone imagery being generated. How should OIN focus it's ingest and/or hosting criteria?

- WeRobotics: If you only think about it in terms or orgs, academics that are producing drone imagery to solve certain social problems, then there is a lot of value to host this data. But the total # of drone operators are hobbiest or commercial. Commercial operators would be very difficult to convince.
- Airbus: data they are capturing is for a purpose, with some sort of confidentiality around it, so may not be able to release that data.
- WeRobotics: Exception could be emergency response. How can commercial operators engage in emergency response? Many volunteered and wanted to get involved in past crises, despite lack of humanitarian background. Would be good to do cross-functional training exercises. Training is essential.

- For commercial satellite and aerial providers, what are your concerns around the design of the platform?

  - ESA: tries to facilitate access to esa data anyway. For us, there is no real issue. No commercial aspect. There are already so many platforms. Don't build another platform. World Bank will not fund Radiant. It won't happen.
  - NASA: easy for us to say we want to get engaged because our data is already there. Increases chances for extracting value from data. Want more use cases and testimonials on how it's being utilized for humanitarian and global development. Another value is potentially getting feedback from non-research community (would be interesting). And get input on things we might want to get, for designing future missions, if global development community can weigh in and provide a collective voice for what those needs might be. Imagery is insufficient – seems like an imagery push – what are global dev needs and how can we support that? We want to hear that there is growth into other topics.
  - Christoph: can definitely spur innovation. Licensing is a tricky issue. ESA has been doing this for the European community – try to facilitate access to non mission ESA data for Europe, but doing globally is tricky. How many staff and lawyers does Radiant have?
  - Airbus: needs to know who the end user might be. Restrictions may apply.
  - Transparency around licensing would be huge, all on its own.
  - USDA: Develop parameters and what type of drone projects to store. Do you only take the ortho? They need to decide/figure out how much it will cost; I don't think they want the raw data.
  - WeRobotics: Having a way to expand the types of drone products that can be hosted would be valuable.

- On a case-by-case basis are you amenable to "donating" imagery either from your archive or for a specific geography?

  -

- OIN would like to users of the platform to be able to see what is available in your commercial platforms so that if they are searching a given area they will be exposed to

the thumb nail of the commercial data and then move over to your commercial offering to purchase or run analytics. Is this acceptable to you and if so will you work with us to engineer this view?

-

- OIN may host hack-thons where it will seek to aggregate a rich assemblage of data for a given geography. Ideally, developers would be able to run their algorithms against multiple commercial and open imagery sources of the same geography. Do you have any specific objections to this approach and if so what are they? Would you be willing to expose your imagery for these events?

-

QUESTION 3: OIN would like to build a "market place" tool into the platform. This tool would allow organizations to define an area of geography where they are looking for data or are considering purchasing data and to alert other members who may have a common interest in that geography thus allowing the multiple organizations to consider their joint requirements and to jointly fund the data acquisition. Further, this tool maybe viewed as valuable to the commercial community to be made aware of joint requirements and could serve to increase competition on any tender. Is this functionality of interest to you?

- Maybe 'Informs' is better
- Need capacity to use the data!
- Yes, there is a role for Radiant in making the market more transparent, reducing some of the confusion in the market.
- Link or host? Airbus says link.
- On website, do a conglomerated search – sends it off to 5-6 data providers
- What's available and what's in progress of being collected?

- What do you think are some of the major challenges for data providers to get data on public clouds?

-

- What are some possible innovations in cloud technologies that will lead to wider consumption of satellite imagery?

-

- What are some ways in which you would like OIN and the community to collaborate using open imagery in novel ways?

-
- What are the perceived threats? Security? Access? Ownership? Related issues?
-

Commercial and Open Source Developers

Chair: Chris Holmes, Senior Vice President, Product Architecture, Planet

Rapporteurs: Jessica Long and Rebecca Stubbs

Big-picture overview: Good idea/bad idea? What do you think of the Radiant Platform?

Democratizing data is important.

Would like to see: Bring earth observation into the living rooms. Build a google for earth observation data? GPS is free or around us, there are so many people, students building gps around GPS, navigation programs. This economy around GPS is enormous, earth observation is much smaller. Bring it to a user friendly way, people can start playing with it, and build a community. Economic potential could come from this.

What he is doing right now, and what the platform can do to help you specifically: He has a platform in which people help solve problems (crowdsourcing). Now currently using sentinel data to detect illegal forest cuts. Warning system for farmers (use multispectral imagery) about real-time disease?

Teach farmers how to manage lands and cut down on deforestation

Examples: refugees, find them and share with humanitarian org.

New ways of helping people- using game and crowdfunding.

Helpful thing from a Radiant would be getting open imagery into his platform. Talking with many companies- they are data independent, want to see the community to grow and engage public. They are amazed with the beauty, can show more than Google earth, make it more available to the public.

Big points from Hans: Ability to get public engaged is huge. Radiant could help get imagery into his platform, but for his own company, he doesn't have any problems getting data.

Carlos: Uses Landsat to help farmers so that they don't deforest new areas in Amazon/Brazil. It would be helpful if they had more accessible, fine-resolution imagery, and of course they can deal with

distributors in Brazil, but it's too $$. Perhaps Radiant could create a price-search that would generate competition between commercial images. An API to embed access to imagery served up from the web, and additional tooling, such that you don't have to go elsewhere to look for data.

Big point from Carlos: Make it more affordable, tools to extract information from imagery that they don't currently have access to. Tools for segmentation, digitizing; API to imbed tools in the software they develop. So, access to imagery and additional tooling to pull into their software.

Discussion on APIs and whether Radiant should generate APIs of their own:

- APIs already exist and Radiant shouldn't reinvent the wheel.
- Concerns:
    1. Make it easy for people to search, and promote the tools that exist. Most people just don't understand what exists.
    2. There are so many APIs that exist already, I don't see the need to create another set (Radiant's "me-too" version). He recommends that the data should be made available in the cloud, make the deals with Amazon, Google, etc., make sure the metadata that's there-- but allow the tools that people have already made to get the data. They don't need to reinvent tools that have already been done. It's stifling for the developer. Do not focus on new APIs.
    Q: Doesn't GOES host a lot of data already? (Has this already been done?)

    A: They are a "system of systems"- catalog that searches out to different places, it's a catalog of data *sources* not of underlying data. It's a catalog of catalogs! They don't host it themselves.

    Q: Are the current APIs proprietary?

    A: No, they are free. Maybe Radiant could collect them in one place, but people can just use the appropriate APIs.

Collect existing APIs, but don't make them yourself

- It might be more cost-effective to collect existing APIs- don't spend a ton of money to generate APIs that already exist! They have an "open location platform"- the notion is, taking sensor data from 3 vehicle manufacturers-- windshield wiper sensor data pushed back into cloud. Bringing in those information, making it commercially available. Integrating disparate data sources is nothing new. Why reinvent this wheel, in many cases?
- Perception that "making data available" is making more data available on some standard data platform. (How to get Landsat out in the most useful format possible). That's the sort of stuff that saves time. If they have some sort of API that shows you

how to access metadata (cloud cover, etc)- but the API of APIs needs a reason to exist. There are already programs that scrape "met files" (metadata?). Radiant should define how the data is structured and stored, and that this is the type of metadata that should be there, and the various crawlers should be able to pick it up and use it. Radiant should be an *independent arbiter of how metadata is organized.*

Should Radiant translate across metadata, or recommend how data should be stored.

More data sets available, saves time. Granular level API is fine, but don't build API just for the sake of it.

Big point from API conversation: Make it easy to search, promote tools, make data with metadata available through deals with large companies, and use previously existing tools and APIs; don't recreate what we already have. Create or promote software to use available APIs.

Radiant should play a role in standardization of metadata- define how data is structured and stored so there is easy use of crawlers to use. Better to build out libraries of standards that already exist? Recommend how it should be stored with the data. Put onus on people to follow the standard.

- Are they looking back in time or add data that is looking forward in time? Social science needs to use historic data with metadata already exists, so this discussion about whether metadata should be standardized back in time or going forward is contingent on whether Radiant wants to foucs on data that is collected from now on, or data that has been already collected in the past.
- need standard around how we use data formats.
- Basically does not believe that "if they build it, they will come".

In development space for who Radiant wants to serve, it breaks between Research and Operational work.

Research work, studies, etc.: poverty over the last 10 years, they want a deep archive, and regular data. Not enough to have 10 images over the last 10 years.

Operational work: Don't care what the system was 10 years ago, they want to know *today*.

Is there enough business space for this to survive and prosper?

There is space if it is as the base level- companies are making money off of making APIs, etc.-- which is starting to infringe on the markets of the people in this room. But, every company is excited about

more free data. Mapbox: When people want to know what is possible, we don't know where to point them.

Breaks neatly into research vs operational work. Op people want deep archive and regular data, not enough to have 10 images over 10 years. People in operational want

Different set of needs for operation vs research- have both needs within the space.

Would love to have a place to point users to get started- educational resources, wikis, get people bootstrapped to the point where they are consuming commercial services. Is to the benefit of Planet, etc. if they can get people thinking about how to use spatial data. Questions about what is possible with imagery- on machine learning side there are aspirations and so what they would like to do is put out really good training data- ag data along with field boundaries, i.e., over time, including high res imagery, below 10m, so they can answer the questions better when they come with us.

Work being done by Planet in CA is an example- seed all sorts of development using planet data. If radiant can help promote the organizations that make the commercial data that would serve a great purpose. Make the areas open and commercial free areas so every satellite provider would provide free data for that area, so everyone can use it test things such as emergency response. **Make the commercial data open in certain areas- people can start developing routines and algorithms. Buy up commercial data.**

However, this is already being done-- and it isn't seeing traffic.

Planet put out "training data sets" of California, but they aren't seeing tons of analysis on it. This means that there isn't incentive for them to continue to make data free- if people aren't taking advantage of the resources that are already there. One person suggested that the data that is available on these sites isn't complete enough-- you need elevation data, cadastral boundaries, etc.-- they called out Portland as an example of an area where historical GIS data is easy to access.

Radiant needs to figure out whether it is going to bring together people to work together, versus providing information about what is already available. Landsat had a blog where they had tutorials-- which is totally the wrong format! It should be a wiki page, that can be edited and updated. It's a bad sign that there is still demand for things that are freely available-- like Landsat data. **A big page of links to resources on how to analyze this data would be a huge step in the right direction.**

Within IOT, in order to answer questions, need to go to all these different places/people to get the different pieces. Have to work with multiple companies. When go talk to companies, they need to come in with all necessary companies lined up ahead of time. Old school methods **Suggestion for radiant: here are the top 10 things that could be useful, here are the free zones we can leverage, and here are the partners. Allows for piloting and measuring of success.**

Enable people to easily access and utilize data.

Think about serving tiles

Jeff: We are the balloon and kite people. Public Lab. would be happy to provide in whatever format, however amount of data is small compared to other people. Like openstreetmap it is a very distributed network- 10K around the globe who don't know each other, mostly used for environmental work. Not major provider players. Glad people are interested in integrating data sources. Thinking of usage: seeing 10 maps that are synced, seeing tiles of different information for one location if they are available. Would be helpful for people with both technical and non tech background- people could get a lot of use out of that as a service. Bridging: even if different providers with different tiles, make sure the reference of the geotif is there. Have tiles and tools and pull in ESRI and mapbox with finished perfect pixels(?). Does see potential- **pull different data sources, cloud that isn't an API but is more than a location, tracks through a lifecycle.**

Jeff: tiles are lowest common denominator, easy to host. Multispectral more complicated. API is important but can extract API.

Data providers want to be recognized, such that if people put the data into open access, the people that consume the data and the derivative products still give attribution to the raw data providers.

Attribution is extremely important-- happy to be public as long as attribution. Users need to reference back to who provided the data, and Radiant needs to make sure there is attribution that flows through to the end product. Aspects like that that need to be considered in open data to make sure that people give the data out. Especially with private companies. But from the user side, what if there are 50 different data sources? Burden on user.

There is a data attribution issue that has to be resolved.

Who solves this? The legal team? The tech team (providing a citation list of data that is downloaded?). Burden is on someone within Radiant, and some part of the Radiant team should solve this issue if they are going to provide the free data.

Introducing Robert Cheetham (Azavea): Build open source geospatial software, created geotrelis, support distributed processing of raster data, including imagery. Climate change, other things, but specifically related are a couple of grants from the Dept of Energy and NASA to develop platform called RasterFoundry. a year into building, just rolled out private beta. Releasing upder open source license, and also building an online SAS service with searchable and processing capabilities, with calculated NDI (?). How different? Initial focus is open data sources, don't have access to digital globe, did an early prototype with planet data for CA, incorporated that API. NASA: make it easier to find and use NASA data.

Who is Azavea's customer? Customer is funding agencies (DOE, NASA), and they have different expectations from each other as well. NASA: Make our data easier to use. DOE: Mandate to build scalable processing tools for aerial and satellite imagery of all types.

How are they thinking about, are they going to let people comment for non-expert user to understand quickly what the derived products are? Is it going to stay more at the imagery level? A: That could be one thing to consider, encourage to stay in or come out of that box. Could be good to come out of that box. A lot of desire for raw product but also high level processing, extends across a different level of processing, grey line no matter what

Radiant could catalog tools for processing raster data.

Many ways to catalog ESA data. Should not compete. Showing what the capabilities are and making people aware and what exists would be helpful. Both commercial and non processing people would be happy to contribute scripts about how to use their products.

Don't compete with ESA on processing imagery! But, showing people the tools, and where those tools live, to process imagery is important. Everyone that works on processing could contribute to this. Scripts: Here's how to use the product. If Radiant makes it clear, and publishes it, "plug and play" tools, or tools that you can adapt, this would be helpful. Here's how to take this from a bunch of pixels to something you can use. Radiant could collect different algorithms for things like collecting road features, and what the tradeoffs of different algorithms and tools would be very useful. "GBDX", digital globe's platform, does things like this already, as does ESRI. Hopefully this could be a way to get people into the market which wouldn't otherwise be engaged.

Suggestion: Build a Library of Open Algorithms

One of the challenges is regional differences- how do you train an algorithm in the Sahara, versus Philippines- more people will still need to distribute it, and possibly will need

Make it easy for people to contribute processed layers to the cloud for people to use.

QUESTION 1: *While the OIN'S focus will be first and foremost on the Global Development Community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What are new trends in geospatial software engineering that are driving developers to open source?*

What are the main tools, libraries, and programming languages that support the open source geospatial community?

Comment: I have an issue with open source- definitely open, but few open source. ESRI promote open, but not open source. Almost no-one listed open-source software tools in this room about their favorite software.

Alternate question: talk about it as open data, not open source.

Across the field in general- ways in which open source are beneficial, if investing in development of a new thing, if used in a new product, but propriety creates sustainability that might not exist otherwise. Cases for each, but be thoughtful of licensing around software for all of this, not just the data.

What software are people already depending on to do image analysis?

Python/Numpy

Gdal-Can be "heavy"

Rasterio- a little "lighter" when building a web interface.

Amazon lambda

R (depends on GDAL)

QGIS- free, important for startups.

Drone image processing: Web GDAL. A lot of graphics card stuff in the browser, and although they should be using Amazon Lambda, but we're too small. People upload individual images and we process them-- however, the more people use other tools, the more people we can serve.

PDAL(?)- pulling in point clouds.

OpenDroneMap: open source.

Opportunity- Radiant could provide a service, free, to upload and process drone data, stitch them together. Some people already do this! ESRI offers some of this processing for free for some groups. Does ESRI want to provide a free service to Radiant?

Radiant doesn't need to do this, it's going to be free soon. Trend is toward free, driven by the fact that it many of these processing tools started off free, but complicated. They like the services, but more info on how to use would be helpful. Same popel 10 years about on open vs commercial. A web-based API or a video

Simple interface, fly a drone, upload. Give public lab some money to do it. Submit 100 images and get back tiles. That's the dream.

Put up a listing of the tools and the prices required to process drone data. The best algorithms depend on the use cases-- "MPM for algorithms" -- having a set of toolkits where people can then build better user interfaces, is a great start.

Advantages: Repeatability (the person that's doing the research 10 years later, they know the math that was used to create the derived product). Commercial products that vanish can't be compared to future research products, so publishing the math is key!

Enabling modularity creates a new ecology of possibility

Modularity- Strategically different choice open source or not, if you produce a modular system where process vs matcher etc. are distinct service, good software arch, but advantage to integrated approach. Mixing and matching, figure out how it was done, switch out one part of tool chain to a different provider, etc. if you could seed all shared points when going over an image, would be great. If you do have good modularity, you allow for ecology of different possibilities.

Modularity question tough, outside of scope, may not be able to mandate modularity.

Open source models can be quite beneficial: invest in the development of a new thing.

Question of storing algorithms interesting- test out on an imagery source where you can get different sources for the same place. If you store, can you distribute or sell the output of the algorithm instead of the source data, more opportunities for providers. Is there a way to have radiant help providers with licenses- not open with imagery but with derived products. Clarity on what can be open.

QUESTION 2:

What are the key challenges with current satellite imagery platforms or ecosystems? What are some specific challenges around access, hosting, processing, storage and cost?

A lot of the government provided data platforms require a human being to create a login, search for a thing, and hit "download"-- computers can't do that, and can't proactively monitor for changes, etc. We have learned that requiring human intervention prevents this data revolution to come to pass.

It's very expensive. Google changed the landscape because it is free (other than publishers). Bing, for example, they used to have their own satellite imagery capture group, but they sold it off, and that there was no return on investment. There weren't enough commercial applications, and other than people like Digital globe,

Cost pooling:

Allow users to drop a bounding box, and "buy-in" to imagery by creating a mailing-list level ability to pool together to buy commercial products for a certain area. A "Kickstarter for Imagery".

Cloud environment makes things accessible. Need to get data into the cloud.

All the successful stories are because the data is in a cloud environment. The biggest challenge is getting datasets into the cloud environments. As soon as it goes into the cloud environment, it's accessible. Hopefully Radiant isn't trying to build their own cloud.

Moving multi-terabyes of data in a reasonable amount of time is still a huge bottleneck.

QUESTION 3: *What are key user experiences that you would like to see in open imagery platforms and why? (*Includes developer experience)

Carlos: I work with communities with farmers and decision makers, and it's important to see the use of applied information. They love higher spatial resolution! But, for visual purposes, they don't see the value of this information for land management and planning. In most cases, we need to conduct cases- with a bank, or with a farmer, to show what's possible. They need to demonstrate that they are not investing in new deforestation. Protocols??

Need to have norms, how they process and extract information for imagery, need protocols. Cost to have the data, how frequently available, internet bandwidth (remote areas without access)- complicated to get to end users.

The last meter: get information to the end users. What is the interface for a farmer? It's an SMS not a map. Need to consider the end user- they don't need a map, they just need an answer. The value is the instructions.

That is the difference between visualization and using location as the driving for innovation.

Academia, Value-Added Entities and Consultancies

Chair: Bob Chen
Rapporteurs: Skye Naslund, Travis Axe

Breakout Session #2: Advancing the Open Imagery Technology Platform

February 23rd, 11:00—12:30 pm

QUESTION 1: What are key user experiences that you would like to see in open imagery platforms and why?

- Supply-chain of data: wants a solid contract that would seamlessly facilitate the data that is needed. Academic "contractor" wants the platform to nicely package and provide what they are looking for, eliminating the potential for the user to search/tailor/select the product themselves.
- Radiant must have a stern strategy and incentives to keep Academics involved
- A very clear and distinct strategy to address social sciences - not just the technical/scientific communities within academia
- Radiant serving as an enabling platforms for existing platforms
- Ability to easily find/select among a myriad of datasets that are pre-processed, well-documented, validated, and trusted.

QUESTION 2: What are you looking for in the OIN platform feature set?

- Is it about data access to many sources/providers?
- Is it about answering questions about the planet more quickly?

- Capacity building for students/staff in remote sensing. If Radiant is going to be a global platform, it must address this idea in developing nations
- Ability to access drone imagery for selected locations.
- A repository specifically dedicated to housing derivative outputs from users
- A repository specifically dedicated to housing academic research derivatives [grad/phd/pi can upload data in research]
- Ability to access/computer/publish data and products WITHIN the OIN platform [without downloading anything]
- Communication platforms that are tailored to specific sectors [ex: a thread/blog/forum for grad students and faculty]

QUESTION 3: What open data sets do you value routinely for your work? What data sets would you like to see housed in the Platform? Is it Landsat, Sentinel 1, 2, & 3, MODIS, others? What GIS data would you like to see housed in the platform?

- Landsat, Sentinel, MODIS are already in DAC data

QUESTION 4: What opportunities do you see for the OIN platform with your community?

- In remote sensing, as opposed to GIS, there is no one major vendor that dictates the market. There might be an opportunity for Radiant to serve as a foundation point for educators.
- Create a standardized workflow that image providers can adhere to in order to create common metadata for end users.
- Distributing computing power through collaboration with other vendors - the contribution of Radiant should be far beyond just storage.
- There is a large, awakening community for geospatial analysis - but the learning curve to understand how to do it is pretty steep and almost infeasible for some; Radiant could provide tools in order to accelerate this process.
- Outreach to research publications/journals encouraging them to advocate uploading of research data to their contributors
- A component to publish success stories from users, and maybe their methodology
- QUALITY FILTER: Using academic partners in order to bolster the validity/trustworthiness of products

QUESTION 5: What key pain points would you like solved by the platform that other platforms don't currently solve?

- Fragmented interoperability between various data sets [different meta data, pre-processing workflows, etc.]
- Making high-res imagery available for NGOs and other organizations who can't

otherwise afford commercial options.
- Module to host algorithms for image segmentation/classification
- Some academic communities don't necessarily understand the opportunities, use-cases, and technical nuances involved with a "flood" of high-res imagery.
- Refining the cost structure to make it relevant, feasible, and sustainable for various types of end users.
    - What is the willingness to buy for various use cases?
- Coupling of Imagery AND operating procedures/guidelines that will serve low-tech/developing users
- Eliminate many of the pains involved with searching/pre-processing of data

QUESTION 6: OIN may choose to host hack-a-thons where it will seek to aggregate a rich assemblage of data for a given geography. Ideally developers would be able to run their algorithms against multiple commercial and open imagery sources of the same geography. Do you have any specific objections to this approach? If so, what are they? Would you be willing to expose your imagery for these events?

- Some new products that Airbus are creating might drive some of the future analysis of imagery: it would be smart to track this progress and tailor development efforts accordingly
- If you ARE going to do a hack-a-thon, don't create it without some meaningful follow up and well-outlined expectations

QUESTION 7: What are the perceived threats? Security? Access? Ownership? Related issues?

- For this platform to do something new, it must successfully merge the accessibility and communication around several disciplines [remote sensing scientists, developers, social scientists, ect.]
- The large vendors of imagery might try to thwart Radiant's efforts. [GBDX, Airbus/Google, etc.]
- Standards that governments must adhere to when making decisions based on imagery
- Sustainability: the business model must be resilient to encourage buy-in
- The platform must go beyond imagery in order to be useful for low-tech users and organizations in developing communities?
- Many academics already have access to a lot of high-tech data: there might not be an overwhelming need in academia for something that Radiant is proposing. Academics might engage more in a collaborative sense than an "end-user" might.

General Group QUESTIONS

- What is the metric for success in Radiant? What does the success story look like in the Academic realm?
    - How is this helpful that is different from what already exists? If Radiant is attempting to

be the "end all" game or the only go to platform, it might undermine a lot of development and efforts that already exist.

- Why did the Foundation fund this? What are their intentions? What outcomes do they want to see?

Attendees

Bob Chen [Columbia University]

Ian [Landmines, Cambodia - Forestry]

Karen Seto [Yale University]

James Walker [UCLA]

Kiran Dwivedi [Center for Science and Environment]

Ulrich Mans [Humanity X]

Lea Shanley [South Big Data Innovation Hub - NSF]

Bradley Parks [AidData]

Lyndon Estes [Princeton - transitioning to Clark]

Budhu Bhaduri [Oak Ridge]

David Skole [Michigan State University]

Matt Hansen [U of Maryland]

Forrest Stevens [U of Louiseville]

Albert Lin [U of C-SD]

Funding Agencies

Chair: Hunter Goldman
Rapporteurs: Olivia Hollenhorst, TBD, Faculty Member

Breakout Session #2: Advancing the Open Imagery Technology Platform
February 23rd, 11:00—12:30 pm

QUESTION 1: **What remote sensing/ GIS applications or initiatives does your organizations currently support, and/or consider important?**

Group Introductions and remote sensing/GIS experience

- Sarah from Hewlett Foundation- Grant making, evidence informed policy making. New and traditional sources of data influence policy research. Fund orgs that work with governments meet the needs of their people. Sustainable data revolution. Grant making for things like GPSDD, not direct tech but cultivate community around open imagery.

- Timothy from We Robotics- Flying labs in developing countries to empower citizens to use tech. Drone specifically for mapping in disaster response and ag. Drone delivery as emerging application. What is the best value added apps in developing world. Tech in hands of citizens as service providers then better understanding of what resonates in those areas.
-
- Yuliya from Omidyar- Funder of Radiant. Property rights initiative to see how new tech can help secure people's property rights. Investments centered around property rights. Create ecosystems that feed innovation. Cutting edge tech deployed towards property rights, mobile mapping.

- Keith- World Bank- Geospatial support team. Help countries build capacity to use spatial data to monitor and eval. Teach ministries to use mobile data collection to prioritize. Investments for multiple purposes, project level and organizational level. Invest in country governments along with consultation on geospatial tech.

- Anne from Radiant- Proof points- launching platform with clearer functionality. Lay clear road map of different versions. Release in July. Outreach and education policy peace is equally as important. API first for hard core users, then user experience. Measure success using quantitative Gates/Omidyar metrics. Also, qualitative metrics for orgs and users. Business plan includes Gates/Omidyar along with future match funding. Membership study analysis to be done. Continue to ensure proof of value.

- Peter- Omidyar- Clear value and importance of spatial data for decision making. Motivation is to reduce overlap and repeat data and applications. Fractured system is signal of silo-ing in community. Umbrella platform to reduce silo-ing. Government portals will always be there but community platform portal can still exist and demonstrate value. Political limitations if one country takes ownership (ESA). Non profit is neutral to everyone and beneficial. Small buy in, large take away. Sophistication of platform includes private sector as well. Efficiency for multiple types of users. Base data set to answer questions surrounding developing world. Machine learning functionality.

- Cassie from Vulcan- Funder and user of geospatial data, finding data solutions to global problems. Find emerging imagery solutions to philanthropic problems. Illegal fishing and how can space based data be used to answer problem. Ultimately create actionable data. Great elephant census, Fin Print (shark census). Central themes- wildlife, oceans.

- Jonathan - UW professor, Epi and Geography
- Olivia- Rapporteur, UW graduate student

QUESTION 2: **OIN views the development of the platform as a back-end infrastructure to support the global development community primarily. The thesis is that OIN should buy down the cost of and improve the application of these technologies over time. Do you agree with this thesis? Are you skeptical? If so, specifically what are your concerns?**

QUESTION 3: **Many of your organizations have purchased large volumes of imagery to support your missions and your grantees projects. Where that data is unlicensed would you like for OIN to house it in our platform thereby aggregating in one place an imagery library for existing and future use?**

- Open Contracts-
    - OGP is good example of open government policies.
    - Understanding implications of licensing and international standards is important.
    - OCDS- Open contract data standards. Require spatial definition for contracts to improve transparency.
    - Radiant could connect through OGP commitments.

QUESTION 4: **OIN would like to build a "market place" tool into the platform. This tool would allow organizations to define an area of geography where they are looking for data or are considering purchasing data and to alert other members who may have a common interest in that geography thus allowing the multiple organizations to consider their joint requirements and to jointly fund the data acquisition. Further, this tool maybe viewed as valuable to the commercial community to be made aware of joint requirements and could serve to increase competition on any tender. Is this functionality of interest to you?**

- Pricing varies for geospatial data and global development projects
    - Need the ability to leverage Radiant as intermediate broker to make data deals between funders and projects. Radiant would help negotiate on donor's behalf?
- Lack of education on user needs.
    - Radiant could help facilitate needs and match data with user
    - Connect data to people and also people to people
    - Needs aren't articulated as well as they need to be in order to procure needed data/tecg

    - Miscommunication enables mismatch
- Leveraging environment toolset
    - Radiant shouldn't act as purchasing agent
    - A well informed community has more leverage collectively
    - Radiant would help create privacy transparency.
- Marketplace would help determine how much can be done with one dataset through Signature library
- Navigating licenses within Marketplace
    - Data license vs derived product different licensing
    - Getting rid of derived product limitations by donor community leverage
    - License terms as well as pricing are priority themes
    - Power of the purse
    - Funders combine efforts to purchase mosaic and then share for general user pop
    - Donors act as purchasing agent and share results with Radiant.

QUESTION 5: **Have you seen program efficiencies and improved outcomes from funded programs that have used geospatial technology to support mission requirements?**

- Sharing methodology
    - Important for presenting value of tools and applications
    - Allocation based on relative priorities
    - Not enough people in the room have the expertise to make argument for GIS
    - Radiant could make tools/methodology easier to use, that would then strengthen arguments for funding
    - **Connecting all of this to peer reviewed research for best practice**
- Radiant's Community Develop Group would focus on peer reviewed use cases
    - Publicize or push out use cases that have been successful
    - Share strong algorithms and research methodology
    - Use cases are necessary for smart funding
    - Thought leadership (research and academics who support models and information) will shares insight with broader community

QUESTION 6: **Have you experienced negative results in the funded geospatial projects? If so, what was the root cause?**

- Duplication of effort-
    - Market place would be tool to create bounding box around area of interest (spatial or theme) and then connect idea with others to develop partnerships.
    - Creates competition for commercial providers that there is an interest in geography
    -
- Sharing and educating teams on benefit of remote sensing-

  - Traditionally tech driven solutions
  - Needs to be fit for purpose solution. What is it that you need to solve, then build based on solution. What information do you need to manage.
  - Three phases to build solution
    - Build capacity
    - Make evidence based decisions
    - Curate and manage data

- Chain of custody Issues-
  - How are they impacted by having an open source framework?
  - Ownership needs to be captured in metadata (i.e. Global Witness use tools/data for redress issues for users)

- Restrictions around procurement-
  - Need to prepare material that can be used for justification on sole source purchasing
  - Lead will structure information to justify purchase, then followers can do the same. Then Bi-lateral agreements will follow unilateral

- Service vs product differences
  - Traditionally aerial photography is product, drone image is service. Service providers have more wiggle room in looking for customers

QUESTION 7: **When you consider funding a geospatial project to support a mission requirement what are your concerns?**

- Data ownership matter
  - Solution is built on transparent data standard so countries can transition to open data.
  - Open/transparent licenses are crucial in regards to imagery
- Imagery Experts are needed but overall knowledge is important in procuring funding.
  - Remote sensing provides opportunity to create hard value-add to present to someone who is not an expert. Metrics of success.
- The missing middle
  - Project results need to transition to sustainable practices in monitoring framework. **Invest in standardized business processes.**
  - Necessary to acknowledge legacy.
- Different ideas of open data.
  - Not always best practice for certain countries.
- Diagonal funding concerns-
  - Donors resourced based on initiatives
  - Teams imagine own budgets and time boundaries so do not have collective purchasing power

  - Wholesale global good efforts that don't fall within the specific projects. Diagonal funding is difficult for approval.
  - What could be exploited internally, what else is needed, what should be invested in? What is the long term landscape of the project.
  - Task forces are created to handle specific issues (i.e. privacy) Making internal connections on resources and interest.
- Donors need highly responsive internal entities that others can be directed to (the Go-To)
  - Size of investment matters. Providers could leverage Radiant to gain visibility against larger providers (government)
  - Community Networking for imagery based projects to reduce overlap

QUESTION 8: **OIN will stand up a consultancy in Year 2 of its operations. This consultancy will support not-for-profits in designing request for proposals, proposal evaluations, and proof of concept operations. The work will be done with in-house staff and with a registry of independent consultants. Is this a service you see as valuable?**

End Users

Chair: Gabriele Almon
Rapporteurs: Meghan Halabisky, Kory VanDyke

RAPPORTEUR TEMPLATE
Breakout Session #2: Advancing the Open Imagery Technology Platform
February 23rd, 11:00—12:30 pm
QUESTION 1: Radiant views the development of the platform as a backend infrastructure to support the global development community primarily. The thesis is that the OIN platform should lower the friction in finding data, buy down the cost of acquiring the data, and improve the application of these technologies over time. Do you agree with this thesis? Are you skeptical? If so, specifically what are your concerns?
Things the group is skeptical about - Already available data and already available tools (google earth engine). Drones, aerial, less commonly used data would be a huge value added. Data collection by project that is not commonly shared.
How does the end user determine the quality of the data? It depends on the question. It could be hard for end users to understand. How do you guarantee the data is accurate? Two questions: Is it good enough for the question asked?
How do you ensure that the data will get used? You may make data cheaper, but are you creating new uses for the data. Are we actually going to create a system to get the technology into the hands of the people who need it. How will this widen the group of users? (Maybe building apps could help). As it is one user did not think it would be particularly useful. Just making it available is not going to make much difference.
How can this tool facilitate the many unique questions being asked? How will it reconcile variability of users?
Skepticism/ Questions on how the platform will operate - What is the architecture going to look like? How will data be shared?Any machine learning? How will bandwith be addressed?

How will the model be sustainable. How does it become something new and not just another set of standards. How will it meet ethical standards? Will the data be bi-directional?
How will Radiant be sustainable? - How will Radiant communicate value? How will you get buy-in of potential users? Why would they use this instead of another platform or imagery that is available to them?
Will we see a more collaborative ecosystem, where users, developers, analysts come together to solve questions?
Need to find anchor programs and establish the out of the box success early on. Must play equal attention to the governance side. Focus on governance right from the front.
How do we make the data more globally available? How do we get locals to understand that data spatially?
Structuring existing workflow and making it more economical to use.
Making data more available immediately on a need-by-need basis.
How the acquisition of commercial data would work and the use of that data.
Needing people to share data better.
Will Radiant help data flow more concisely?
Greater emphasis on what the user is getting out of this.
QUESTION 2: What open data sets do value routinely for your work? What data sets would you like to see housed in the Platform? Is it Landsat, Sentinel 1, 2, & 3, MODIS, others?
What GIS data would you like to see housed in the platform?
We use everything we can get our hands on.
Many in our group don't routinely use data. Analysts use data, but there is a disconnect. Need someone to bridge this gap in understanding - "Bridgers". Need help in standardizing the measurements (e.g. indices) that make the data more easily used and understood across a broader user group. Engage the group of practitioners, not just the individuals.
However, there was a lot of discussion about the need to think about the standards by the user groups (e.g. conservation groups), not just standards on the GIS side. For example, people may think in polygons and not pixels. Need support to help understand the data.
QUESTION 3: What analytical tools would you like available within the platform (both open source and commercial functionality)?
Radiant needs to improve the ability of other platforms to communicate
Decision trees.
Standardization and interoperability for imaging data between big data and small data.
Streamlining imagery data by decreasing the delay in which it is acquired/accessible.
Don't put any investment in building analytical tools. Make data smaller to be shared easily.
QUESTION 4: What User Experience with the platform is most important to you?
Better connection with between the global level and the local level in both directions. Radiant can help translate local efforts up to the global level and help translate global/ national goals to the local level. There should be a data loop of data/knowledge sharing at all scales.
Improving the developing world's access and understanding of geospatial data.
Some thought - Radiant should focus on imagery. Don't take away from other platforms.
Others thought - Pixels (imagery) is only so useful. Decisions are made at management units (polygons). Radiant could be enabler in helping address this disconnect. For example, there needs to be standards on conservation measurements for sharing across areas.
Position themselves to be more competitive at providing data for NGAS.
QUESTION 5: What pain points do you have now in trying to find remote sensing and GIS data and how can we alleviate that?
Narrowing down where to access the data and whether or not it is reliable.
You have to know "who to ask" in order to find the right data.
Radiant should help solve how to find data and easily access the data.

"The data you have is no longer the data you need." Data is continuously updating.
Deterring clients from thinking the highest resolution data is always the best for their project.
Creating standardization for the data.
Addressing who is in charge of the data.
Most users do not have the capability of using imagery (tiles, raster, etc).
What you're trying to create or perform controls what kind of data you are trying to obtain.
It's difficult to access the same data using multiple APIs (ESRI, Google, etc).
Radiant should group imagery based on different user needs.
Cost hinders the accessibility based on the users economic resources.
Difficult to find the data, especially in remote areas.
Improving discoverability
Wading through imagery can take time.
QUESTION 6: OIN would like to build a "market place" tool into the platform. This tool would allow organizations to define an area of geography where they are looking for data or are considering purchasing data and to alert other members who may have a common interest in that geography thus allowing the multiple organizations to consider their common requirements and to jointly fund the data acquisition. Further, this tool maybe viewed as valuable to the commercial data supply community. Is this a tool of interest to you?
Did not answer
QUESTION 7: Many of your organizations have purchased large volumes of imagery to support your missions. Where that data is unlicensed, would you like for OIN to house it in our platform thereby aggregating it in one place, an imagery library for existing and future use?
Y: 11 N:7
QUESTION 8: OIN will stand up a consultancy in Year 2 of operations. This consultancy will support not-for-profits in designing request for proposals, proposal evaluations, and proof of concept operations. The work will be done with in-house staff and with a registry of independent consultants. Is this a service you see as valuable?
Y:18 N:3

Breakout Session #3: Engaging, Strengthening, and Expanding the Global Community

February 23rd, 1:45pm – 3:00pm

Data Providers

Chair: Kass Green, President, Kass Green & Associates

Rapporteurs: Katie Fellows and Jonathan Engelbert

QUESTION 1: While OIN's focus will be first and foremost on the Global Development Community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for OIN to grow the user base as it relates to capacity development, thought leadership, and community development activities for this broader community?

Please provide specific examples or insights in the following areas:

- Use case analysis
  - SDSN SDG white paper; HHI examples and materials; SDG infographic/white paper to crosswalk use cases and needs; Ramani Huria – repository of tutorials across imagery; global partnership for sustainable development data – great convening power already – data collaborative model; Satsummit insights – perhaps use this event to continue cadence of communication; twitter chats (e.g. DigitalGlobe's #opendatachat)
  - Data provider websites host case studies; industry magazines/journals publish a lot of case studies
  - Example of successes and failure analysis of cases that didn't go well. Also ties to the opportunity to segment the Global Development Community to select an initial tartget market(s) [enduser] and pilot a project, ideally similar to existing use cases – replicate and leverage past successful project.
- Internship & Fellowship programs
  - NASA DEVELOP
  - Worth looking at examples like the Merck Global Health Fellows program or C-SK Pulse for examples of corporate employee engagement. Each bases employees with specific NGOs for limited term assignments to solve a particular problem.
- Imagery market analysis
  - No need, not a job for Radiant
- Measuring outcomes and performance metrics
  - Resources for the future and NASA cooperative agreement known as VALUABLES
- Open Data License analysis/thought leadership
  - Create a model license; see if vendors are willing to license data at that level; cost of license; marginal cost if already have copy of imagery
- Analysis of commercial costs and why licenses are necessary to support a vibrant commercial sector
- Sponsor hack-a-thons
  - Just ask industry to help support – data prize vouchers
  - International Space Apps Challenge; 2017: April 27-28, managed by NASA Earth Science
  - USGIF + DGI, VA office, one weekend (2014?)
- Thought leadership on the remote sensing regulatory environment
- Review of R&D in hardware, software and analytics
  - Not appropriate for Radiant's target market

- Opportunites to grow user base: market facilitation, figuring out licensing, creating a forum for licensing… covered in the morning session.
- Education – get non-specialist users using the platform. That is the key thing.

- Why haven't other organizations been successful? Many users don't know where to look for the education they need. For Radiant just to be a site for that type of information would be really useful.
- Don't do branding very well. People don't know about them. It's up to Radiant to get the word out about them.
- What are the lessons learned from other things working/failing?
- Sheer viral marketing from the people who've already invested to be here (at the thought leader summit) – that's a great opportunity and way to grow the user base -> ACTION ITEM
- "Less thought leadership, more tutorials" – very impactful for this area.
- Radiant should do an inventory of all workshop, training opportunities – put it all in one spot, one site.
- Radiant brand – will have a Radiant point of view – people will go there because they will have 'the best' training materials. Needs to be a reliable and constant voice. Should also sequence training, help people know where to start.
- Online capacity building wont cut it – need in person training, be hands on. The internet won't solve the problem.
- Identify gaps and fill them, but don't duplicate things that are already out there.
- Models of capacity building that have already worked: really context specific. There are some good success stories that Radiant could look at and follow.
- Certification possibility. USGIS did a certification and it got bogged down. Others have been successful.

QUESTION 2: In terms of the Global Development Community generally, what is your take on their levels of understanding of the power of GIS enabled imagery?

- Do they fully appreciate what data and imagery can do for them – their organizations, their community at large?
- What topics areas should we focus on to increase their knowledge a capability? For example, consider Imagery characteristics and/or resolutions, market dynamics, new applications, etc.

- This is highly variable. Can't be all things to all people. Maybe over time, there are evolving audiences. Which audiences are most likely to succeed at various points.
- Identifying the audience that you can help. Start with the low-hanging fruit, bring them up from ground-level. However, starting at zero is risky sometimes. You need to communicate what you can and cannot do with certain data; there are limitations that people may not understand. So pick the audience that is the biggest bang for the buck, not necessarily the least educated.
- SERVIR – NASA/USAID collab – one is in Katmandu – may want to pose an example, be a guinea pig of determining what the needs are. There may be a ready set of projects/needs that SERVIR (or other groups) is looking to address – maybe there is something there they want to throw out to the Radiant group: who here wants to help with this, through Radiant. Another example at the World Bank.
- Sort out – what are the priorities.

QUESTION 3: As data providers, how can OIN be helpful to you in securing the right kind of continual engagement and feedback from the communities we will collectively serve? How can OIN help to increase demand for—and appreciation of—the data that you provide to support their missions?

- Create feedback directly to those collecting the data.
- Having extra help doing community feedback/engagement
- Radiant can help facilitate volunteer/company sponsored engagement – giving away hours is easier to do in the private sector than writing checks
- Want to avoid a black-out scenario
- Just because someone is downloading the data, doesn't mean they are doing anything with it – need some form of feedback loop that allows users to say what they've done with it, was the data wrong, etc.
- Build into the website so people can talk about what they used and what they found. Like Amazon or Yelp.
- Encourage acknowledgement.
- Rankings. If Radiant can measure frequency of access (are these bytes moving)? Indicator that something is going on. Radiant can then provide that to provider community – what people are actually using. Market intelligence – feeding back to data providers.
- Also in Radiants interest to give credit to where the data came from.
- Feedback should be built in – make it so that users HAVE to give feedback in order to use (like checking out e-book, if you want to renew, you must rate it first).
- Request where need imagery where there isn't imagery. Will quickly see concentrations of areas that a lot of organizations/users need data/imagery. But people may not know what they need/what format/etc. How can you deal with those requests to give something meaningful back. May not know what to ask for.

QUESTION 4: In your experience, what are the concerns that different sectors of the Global Development Community have shared with you regarding "Open" Data, and the usage of open data platforms and tools to support their programs?

- What are the perceived threats? Security? Access? Ownership? Related issues?
- What concerns do you have regarding the establishment and growth of The Open Imagery Network.

- Timeliness – if too timely, bad actors can use that information.
- Some countries worry that the data can be 'faked' – need some sort of validation. Many are concerned the data could have been altered, and they won't know.
- Open ackowledgement – use with caution.

- High resolution of vulnerable populations – issues/concerns with safety. Want to make the data 'quasi' open, but don't release sensitive information onto the internet, where anyone can use it.
- Don't understand 'permissions'. "Who gave you permission to fly over my country?"
- Data providence – people may download, modify, then claim it's the original
- Meta-data accuracy – fundamentally basic, but still have issues.
- Are they holding or linking data? If just linking, then pass the responsibility to the users to make sure data is reliable.
- Trasparency.
- Radiant could be in position to maintain a registry of data products they produce.

WG 7—Commercial and Open Source Developers

Chair: Chris Holmes, Senior Vice President, Product Architecture, Planet

Rapporteurs: Jessica Long and Rebecca Stubbs

Any important key points from last breakout session?

1 thing that burns: Generally, this industry has an industry of not paying much attention to end users and applications. And usually the end user is the last bullet on the slides, which makes me feel that it isn't being taken seriously. The discussion is technology-centric and not user-centric. Why not prioritize free application areas to do simple things first? Eliminate the idea of "best practice"- there is no such thing. Get some "good practices" examples in place.

QUESTION 1: While the *OIN's* focus will be first and foremost on the Global Development Community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for OIN to **grow the user base** as it relates to capacity development, thought leadership, and community development activities for this broader community?

First define the customer

Before encouraging Radiant to expand the user base, think about who in the development community is actually using it-- WHO, specifically, at the World Bank is the user here? Is it joe field officer? OR someone with a lot of technical skills? Radiant needs to think about the technical background of the customer.

In the startup realm, I'm asking the following questions: Who's my customer, and if I'm going to pilot this, what are their needs?

Sponsor Hackathons- create a challenge. Here is the problem that needs to be solved, make a competition out of it! (ESA does something similar-- here's a bunch of open data, come up with your best shot at it!).

Specific ideas: Radiant should talk to NGOs, define what the problem is. Ask them for a particular geography, what are some of the issues that could be solved with image data?

Ex: Identifying crop types in Africa. (Probably too big for a challenge?). Pick 1 small area- these are the problems…

More than the scientific challenge: The **challenge to package that in a user-friendly way**. Object oriented: it comes with functions that can be used!

Ex: cell phone notification based on study results.

Everyone always passes on X use case. What is the use case. We know what's possible with satellite data. What is a case that might be possible, can we come up with 1-3 things based on what we have seen?

Important- create end user needs.

Define end user needs: It's our task to show them what the benefits of satellites might be for food production.

NGOs have been sending him away-- working with commercial entities, and they have been paying him.

Specific example of what Radiant could work through end to end?

As soon as you get data in the database, as soon as the data is available, send over text SMS to the farmer, could do it faster than ESA because they need to process, download, algorithm to detect x and y.

I can see a model where Radiant builds a platform around developers in Nairobi. One of those is a startup that says we will help government extension officers that will tell them, "this is the amount of acreage and this is the value of your cashew crop"- identify business opportunity. Radiant has gone to Nairobi, run a workshop, company goes there: we'll build this application, that will work for all the extension officers in Kenya, and will sell that to a government.

How planet found success: We start with a training about the imagery- how to use imagery-- assuming that you have developers (ihub?), that can work with the platform and do a day or two training. Have

good wikis, tutorials, etc. Run hackathon for a day or two after that. End user is a software developer in a developing country.

Radiant has a strong action there- in terms of development of the platform need it to work in poor connectivity areas where power is down, so it has to be fast enough in Kenya.

Define the scope of the challenges- they don't need to build the platform to solve that challenge. This is the problem, you need something, the bandwidth needs to be limited to x, here's the scope, that's the solution. Radiant can lean into it.

Do Gates and Omidyar want to see another platform as part of the point? Cloud-based tutorials and imagery?

Gates aren't silly-- what are the platforms that are currently available NOT doing, that's forcing them to invest many millions into doing something like this?

They've encountered operational data scarcity. Not being able to send people into the field and be effective enough, they've had to build their own data, and they don't feel they should need to be doing that.

As a group that's getting more into working with geospatial data, there's a real frustration with the unavailability of commercial data. Some groups buying the same stuff again and again-- we don't want the development industry failing to coordinate.

Build repeatable tools! A case for some sort of common understanding of what the data needs are, and pursuit of filling in gaps. The development sector doesn't have geospatial experts. Is Radiant trying to be that go-between? There will be a technological underpinning here that is being called "the platform" -- **but the need is not just data, it's also functionality. It's a legitimate question-- how much commonality in functionality is there**? These 7 funders are doing a thing for health-- do they all need the same tool, or do they all have different needs, and really what they need is a bunch of different environments for solving very different questions.

Problems:

1. Around access to resources; could be patients needing meds, farmers needing store houses; 2. Planning that involves space- it can be their own teams, it can be logistics. So temporally dependent

There's a difference between operational and research data needs. At one point, it seemed like Radiant wasn't going to do humanitarian response, because people were already doing that, so perhaps they were trying to do it?

Kickstarter for imagery: that's a very platform/tech-centric way? How NGA and DOD has a task: that's someone's job. Is the imagery market analysis just a person? Why make this a technological platform instead of a human?! The role is human resource that negotiates with industry.

2 issues in Africa:

1. A lot of agencies buy the same data multiple times, everyone is buying because no one knew what everyone else has. There is no mediator that will tell you what product to use!
2. Sustainability. Lots of aid agencies come in, disappear, project disappears. When it fails someone suddenly doesn't have those applications anymore. Real life consequences to these failures.

Reminding me about when Google Earth Engine was starting out- everything started with a big question or problem to solve. Most countries didn't have the capability to participate in the climate change negotiation= they didn't have the ability to produce the maps. Coming from the NGO sector, we were running our system in the Amazon system, and they saw the potential to enable NGOs in those countries, to do independent forest monitoring. It started out with this problem they were trying to solve- and now companies are using Google Earth Engine. What's missing here is the big questions-- I like the idea to do cases, but we need the scaling perspective- once you demonstrate that it's possible, how do you scale up? What is the key big question that they will address? The geospatial industry does probably have solutions.

Radiant knows that it's hard to manage resources- land, food, people, money. Their hypothesis is that a lot of that can be solved by access to raw or derivative observation data. Because that's such a big thing (not forests, or emissions-- but *everything*) that's a hard thing to measure. If they just picked a few big questions.

Where to put agriculture investments because of potential famine? Did an analysis where they asked a room full of people their input, but they were basically just drawing a circle-- they're making bad decisions based on imprecise data. **If you have freely available, open imagery, which allows an audience to make better land investment decisions, then you've won**.

One entry point: the SDGs. That can give you the categories to start with.

Pivot back to questions on list:

More on hackathons:

Internships and fellowship programs: General feelings are "yes"- you can imagine that embedding someone who really knows what they're doing in an organization, but that usually doesn't work, because the organization never appreciates what they can do in the first place, and no one can take over their work when they're done.

A fellowship: a remote sensing specialist going to Africa-- do you help Africa? Not necessarily, but you do return with a better understanding of the use cases and problems to begin with. What about bringing Zambian NGO/health worker here instead? Where they can learn remote sensing? (Wait… ITC already does that). The huge challenge is that when you train people up, they don't work for the government, because the government doesn't pay well enough.

These internships-- it helps if they give an intern a really good scientific paper (implement that or re-implement that, make it robust against other cases), they make a contribution, and then you get incremental progress. Not just a repository of algorithms-- there's a big difference between "algorithms that people have written about" and "algorithms that people can use".

Again, Radiant still doesn't have its end users defined. How can we target the fellowships without knowing what the focus area they're trying to achieve?

Chris: For the purpose of this discussion, lets define end user as "It's a developer in Kenya". Given the structure of the platform, you can intentionally target a developer, as a group, we should come back as a group to radiant with concrete goals, and let's just focus on that one. Rather than saying "if only we knew what they wanted"- let's just proceed with the conversation as if it's a developer in the global south, because it's concrete and actionable, soon. Maybe the fellowship is the person that does an exceptional job at the hackathon. Make it part of the prize.

Business model of sustainability- missing component in this list that was provided.

"Remote sensing regulatory environment" -- is that capacity area for Radiant-- legal help dealing with governments where they aren't comfortable giving out satellite data? Offer legal services that know about intellectual property, etc., that can get around government structures.

What is the value of Landsat? Advocate to the government for the reason why this should be public.

Note on drones: Omidyar has that covered with another project.

What about places where non-governmental uses of spatial data is really controlled- like Pakistan, where non-government mapping is illegal?

Change the target from "developer" to "configurer"- make solutions for state or local government to plan school outings--

QUESTION 2: In terms of the Global Development Community generally, what is your take on their levels of understanding of the power of GIS enabled imagery? Do these users or future users fully appreciate what data and imagery can do for them, their organizations, their community at large?

No.

There's a lot of power in terms of modules that would help you choose what to pick and where to find it. And there are a bunch of groups that have learned something and believe they're on top.

QUESTION 3: As developers, how can OIN be helpful to you in building the outreach, capacity development and thought leadership programs in support of open imagery?

I don't like the question. Open imagery isn't the end game, is it? The fact that open imagery might help something is what we're aiming for.

I'm very bullish about the consulting practices- I'm excited about the idea that Radiant might make NGOs better informed. I think it's **in my benefit to have better informed consumers,** better defined training data and problems. If Radiant is doing good outreach, more reasonable requests, we can compete better against groups that are selling snake oil, and no-one knows how to evaluate that. Radiant- **help NGOs write RFPs**, and evaluate the bids.

Help make data available- write it in that it is made available for X activity, and it is much easier for others to use.

If Radiant can provide free hosting to outputs-- and do what? Set up servers? No- it's the cloud native format, to just pay that hosting cost… There's massive amount of imagery sitting in drawers that could be sitting on the cloud, being used by people. [Well, only if the licensing agreement allows others to use it]. Need for Infrastructure, pricing, etc but the main obstacle here is the licensing.

Suggestion: what if Digital Globe had the license be free if Radiant paid them %20 more?

Imagery was bought by NGO "A". Radiant finds out about the data, it could be used for a bunch of other NGOs who don't have access. Instead of that data never going to be seen again, we can change the license for it to become free data/"Open" to NGOs...Open for a non-commercial license? Keep in mind that "non-commercial" isn't clearly defined- supporting local economy and making it viable and useful at a small-scale business level is important! The dividing lines are grey.

Substantial intellectual and policy challenge.

For Rolf's project, they bought a fair amount of RapidEye/Blackbridge data, tried to negotiate that Digital Globe could make this available to other grantees. Extra cost was prohibitive to the Gates foundation. Uplifiting to a general open license may not be feasible.

This means that **maybe Radiant could "be the pool" that buys out this data.** Maybe this doesn't work for Digital Globe, but having 1 front, on behalf of this entire community, we all care about issue XYZ, and that brings leverage…

"Putting on the planet hat"- that number has to be super high, because that's the total market that you're eliminating buy making that data free.

Radiant could help with the training data, and if Planet gets new innovative algorithms that build on that data, that's the value added of making that data free to use. It's Not just the buying power, it's the intellectual products that are generated from it that Planet might value.

Licensing model is going to change- often, you are buying access to the imagery's outputs, not the imagery itself. That's less than that access of the imagery-- how do you define a "derivative product"- they're willing to do that if you will be re-selling that product and they can take shares off the top.

This is the "Open Imagery Network", right? This isn't just for the developing communities or developer communities-- this is meant to be open access entirely. Lot's of people focus on satellite stuff, but all the aerial and drone imagery that people are gathering might be really great.

Note: isn't openAerialMap already doing this?

QUESTION 4: In your experience, what are the concerns that the different sectors of the global development community have shared with you regarding "open" data, and any past or present usage of open data platforms and tools to support their programs?

- What are the perceived threats? Security? Access? Ownership? Related issues?
- What should OIN keep in mind, when building an open data platform for the GDC?

Provide access to the data, not provide access to an API.

Some legitimate security and privacy concerns. This keeps coming up. We're operating with very little knowledge of what the harms are, and greater, thoughtful study would be really good. We need better information of the real and boogeyman harms.

Size of the data should not be a form of security. There's no point in having a security system, because as soon as someone downloads it onto their hard-drive, they can do whatever they want with it.

Don't overdo the security thing. The security talk should be about the security of the data itself (and how dangerous it might be) not how you distribute it.

Academia, Value-Added Entities and Consultancies:

Chair: Bob Chen, Director, CIESIN, The Earth Institute, Columbia University
Rapporteurs: Skye Naslund, Travis Axe

QUESTION 1: While *OIN*'s focus will be first and foremost on the Global Development Community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for OIN to grow the user base as it relates to capacity development, thought leadership and community development activities for this broader community?

Please provide specific examples or insights in the following areas:

- Use case analysis

- Internship & Fellowship programs
    - Maybe fellows could research areas that add value and then focus on making them
    - This allows Radiant to become useful to more people and ideally bring people into the user group
        - Document the need and then meet it
    - Fellowships are a hook for making collaborations with institutions and organizations
- Imagery market analysis
    - Radiant may need to increase the usership to make this work (can charge 99 cents instead of thousands of dollars if many people are buying)
    - What can academics do to grow the user base in the Global South?
    - Google Earth is a great storefront for imagery, but they are still not making any money
- Measuring outcomes and performance metrics
    - Promotion of flagship projects that show that certain things can in fact be done
- Open Data License analysis/ thought leadership
    - Analysis of commercial costs and why licenses are necessary to support a vibrant commercial sector
- Analysis of commercial costs and why licenses are necessary to support a vibrant commercial sector
- Thought leadership on the remote sensing regulatory environment
    - Driven more by the commercial sector
        - This leaves the open stuff in the lurch
    - Someone should keep track as this updates quickly
        - There are sights that already do this (NewAmerica, USD)
        - There is a lack of leadership though
        - And who is tracking this in other countries?
    - Regulatory environment [especially with drones] might be best being tracked/advocated by Radiant – NOT necessarily driven by them
- Sponsor hack-a-thons
    - There is increasing fatigue about hackathons
        - Don't plan it without a clear focus and follow-up
            - Example: funding for the winner to develop the next step
            - There isn't follow through without incentive
        - Design of the hackathon is important and this is how Radiant can make a difference
        - And academics can help with hackathon design
    - Some people think that hackathons are over because they aren't sustainable (they are one time things), but others think there is still power in hackathons if we are creative (Examples: QGIS, hackathons as pairing people who wouldn't meet otherwise--as a sort of technical and idea speed dating)
    - Uses of hackathons

        - Open source community development
        - Software for drone imagery rectification needs to be developed
    - Can go further so that the hackathon isn't a unique event, but part of a curriculum
        - Need to share results, storytelling
    - Maybe it isn't the role of Radiant to call attention to remote sensing through hacakthons
- Review of R&D in hardware, software and analytics

QUESTION 2: What would you like to see OIN do in terms of engaging the intellectual thought leadership you represent into the development and evolution of it's *data platform*?

- Academia provides domain expertise
    - Example: NASA started the DAC program--lots of data, little domain expertise, then allowed other organizations (many universities) to become data centers which increased domain expertise
    - Seek academic assistance in developing domain expertise in each of the areas presented in the opening (climate change, property rights, etc.)
    - Important for impact (can't have impact without domain expertise)
- Opportunity to create distant learning management platforms
    - Knowledge management platforms are big now--role for Radiant to enable
    - Virtual laboratory that enables learners to use spatial data and imagery
        - Not just a discussion forum, but mapping collectively in a virtual environment
        - Huge possibilities for cross cultural and South-South collaboration
        - Could be around a particular technology, but Radiant could enable the provision of data, etc.
    - K-12 or higher ed
        - Democratizing access to users in the Global South, but also increasing exposure of people in the Global North to other geographies
    - Huge demand for in service learning for educators
    - Educational translational role is a gap that should be filled
        - Translating why imagery is important to the general public
        - Doing this in the Global South is different than here
            - If Radiant is going to focus on a single thing in order to do it well, it needs to be in the Global South
    - Create a platform that would enable academics to create MOOCs and other teaching platforms
        - Simplifying access allows us to do better academic work
- Open libraries
    - Fellows could be brought in to develop particular softwares, structures, libraries
    - This could also be done as a hackathon
- Usable for educators

    - Most educators are not GIS/Remote sensing specialists
    - Need training imagery to learn on (random sample of datasets)
    - If we open the floodgate, many people don't know how to deal with the flood
    - The GIS community is building a teaching community and curriculum (Cyber GIS project called Fellows) that Radiant might use as a model
        - Particularly teaching materials that enable teaching the topic without having to teach a single goliath software with high market share
- Usable for Global South Actors
    - Need capacity building and hand holding
        - Have limited computing power (not just data storage)
        - Data needs to be accessible--if you can't figure out how to download it, how can you be expected to use it
    - We tend to be very parochial--focused on how things work here
        - While some will want more, most NGOs in the Global South just want a recent image of their geography
- Don't try to be everything for everyone
- Research user base to figure out the unique and non-existent applications and build your model around this
- Consult with major fellows from the global development community in order to flesh out primary objectives
- Ensure the data platform also has domain expertise – NOT just people who are good with data and imagery

QUESTION 3: What would you like to see OIN do in terms of engaging the intellectual thought leadership you represent and incorporating recommendations into it's *support and evolution of the community development activities*.

- Who is the community? It seems like everyone, but is it?
- Community engagement with the drone software community is a high priority
    - Drones are perfect for mapping a small area in high resolution
    - Drones are cheap and easy
    - The problem is getting drone data up to a platform where it can be pieced together, organized, georectified
- Tighten link between data producers and data users in meaningful ways
    - Give feedback on how things are being used
    - Currently there is little mechanism for creating these feedback loops

QUESTION 4: What do you think are the respective merits of incorporating the following into the engagement that OIN conducts with your community:

- OIN fellowships for members of your organizations/communities?
    - We can embed our PhD students into small startups in the Global South to help

them better understand what data science is and its potential
    - We can send fellows to Radiant, but not until there is a stronger structure
- Briefings on aspects of GIS Imagery/Open Data/GDC adoption of such tools?
    - Make globally visible
    - Make clear how to use the data
- Forums/Symposiums, other types of public engagement with the work and remit of OIN?

QUESTION 5: What suggestions do you have to ensure that beyond the successful development and application of its open data platform, OIN can contribute to the wider debates and discussions within your communities, in terms of the ethics/efficacy/evolution of open data and GIS, and its impact on the global development community?

- A project like Radiant has a two year lifespan before it has to be sustainable
    - Maybe don't try to do everything--pick one and do it well
        - Pick flagship projects
    - Don't be everything for everyone
    - Many of the things are low cost, can start there
        - Building apps
        - Start small and see what works along the way
    - Identify the niche
- Connections with academia
    - Radiant as a place to post research--a new public
    - Radiant as a clearinghouse--get students to test things on Radiant
    - Foundations don't always have the expertise to guide their own investment (many grantees end up buying data and imagery they don't need)--academia can help
- "Earth imagery for impact"
    - Impact isn't just about data, but data to knowledge to results
    - Impact is about scale--the number of people you get involved in the technology
        - Doing something specialized is already out there
        - Radiant's impact will be in making this accessible
- As academics, why would we go to Radiant's website?
    - To find data we wouldn't already find
    - To find tools to use that data
    - To connect with people (publics and collaboration)
    - To what end?
        - Geospatial is awakening in the development community
            - So what are the development objectives we think imagery can help?
                - Environmental degradation, sustainability of development, disaster relief, famine relief, crop monitoring, etc.
                - These require different spatial scales and algorithms

        - Not all of these things will need academic blessing, but if we engage, we can help increase the rigor
    - To make science better--there are academic departments and communities that also aren't taking full advantage of imagery and geospatial data
        - Even in geography, it depends on the type of geography--Ex. Economic geographers aren't using much imagery
            - No, but market researchers/analysis is using it (Ex. counting cars in mall parking lots)

Funding Agencies

Chair: Hunter Goldman, Senior Program Associate, Rockefeller Foundation

Rapporteurs: Olivia Hollenhorst, TBD, Faculty Member

QUESTION 1: **While OIN's focus will be first and foremost on the global development community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for us to grow the user base as it relates to capacity development, thought leadership and community development activities for this broader community?**

Please provide specific examples or insights in the following areas:

- **Use case analysis**
- **Internship & Fellowship programs**
- **Imagery market analysis**
- **Measuring outcomes and performance metrics**
- **Open Data License analysis/ thought leadership**
- **Analysis of commercial costs and why licenses are necessary to support a vibrant commercial sector**
- **Thought leadership on the remote sensing regulatory environment**
- **Sponsor hack-a-thons**
- **Review of R&D in hardware, software and analytics**

- Who is the target user group?
    - Community Development platform functionality
        - Focused on global development community
            - governments, multi-lateral orgs, grantees, ngos, academics
        - Focus on range of expertise
            - already established orgs with GIS experience to bring up capacity
            - not a lot of hands on training
        - Partnership cascades

        - i.e. Radiant partners with Nethope partners with smaller projects
    - Selected vendors will be first targeted user for API functionality in July (higher end consumer)
    - Each roll out will expand user group
        - systems mapping strategy to build community buzz
    - Build out systems in Global Health as a priority
    - Small business will also be a priority
- Providers- International organizations, governments, drone community, imagery manufacturers, commercial community.
    - First priority will be open sources
- Priority stakeholders or interest groups
    - Omdiyar- Country governments in Global South
        - Radiant will partner with groups like GEO rather than country to country
        - Radiant will support governments through fostering international orgs
    - Hewlett- How would a group of governments work with Radiant
        - i.e 4 countries in Eastern Africa want to work on maize ag productivity. As part of a collective, how would they use Radiant?
            - Marketplace and consultancy would be helpful
            - Most likely, 4 countries would go through providers or other established orgs who would then go through Radiant
            - Consultants or agencies could use Radiant's functionality and open data curation
        - Applications must be useful and cost effective
    - Virtual Events would be option to reach government actors
        - Direct feedback through virtual channels
            - MOOCs…online training
    - Radiant must network to first circle connections to build out capacity (touch points in community)
    - Marketplace acts as force multiplier
        - In site networking?
        - Registered areas of interest to match orgs up based on data or geography
-

QUESTION 2: **What outcomes do you desire to see from "open" data and imagery, supplied to the communities that you financially support?**

- **What do you perceive to be the benefits and opportunities of open data platforms and imagery for your core missions and values, that we might take advantage of?**
- **What do you perceive to be the disadvantages or concerns of open data platforms and imagery on the communities you support, that we might address?**

- No restricted licensed data on the platform
    - Radiant will not police data
- How dose Radiant help if users need data that is licensed?
    - Data use must be repeated if licensed data becomes unlicensed and hosted on Radiant
    - Market changing so fast that buying down future cost becomes difficult
    - Long term binding contracts are not viable
    - Incremental purchasing
    - Many providers are selling services rather than images
        - Not just raw data but derived information
    - Middle space is where small businesses derive results continuously rather than incrementally
        - Costs of deriving is lower
        - Governments need to shift focus on derived results rather than bulk raw data purchases
        - Something is better than nothing
        - Image companies sell pixels and the user makes a product
            - Now image companies sell API rather than one time data bundle
            - Radiant will connect the right API to user to use stream of data
            - Also will help negotiate lower price per pixel
            -
        - Trusted broker role provides middle actors security and options
        - Radiant's environment will be conducive to cloud computing and continuous data streams
        - Radiant will expose resources, commercial and open
    - Donor community most interested in consultancy role
- Quality of drone data
    - Meet ethical standards
- Extra partnerships
    - Sail Drone
    - MODIS

- Registry approach
- OpenOcean (terrestrial is more popular than oceanic)

QUESTION 3: **What open data applications or initiatives does your organizations currently support? What is the basis for that support? Would you consider funding them if they were expanded upon, and included in, an open data platform and program?**

QUESTION 4: **What do you think are the respective merits of incorporating the following into the engagement that OIN conducts with your organization:**

- **OIN Fellowships for members of your organizations/communities?**
- **Briefings on aspects of GIS Imagery/Open Data/GDC adoption of such tools?**
- **Forums/Symposiums, other types of public engagement with the work and remit of OIN?**

- Partners will refer clients and customers to Radiant for training and resources
- Training of trainer capacity
- Fellowships stimulate connections into Global south
- Commercial partnerships contribute internships in countries if Radiant funds
- Re granting, stimulate key pilots in key areas with small award for competition
    - Build use case
    - Build brand
- Shift commercial providers to Global South
    - What they offer vs what global south clients need
- Two way street
    - help end users
    - collecting data on user questions/needs
    - i.e. what do we think people want vs what they actually want
    - Radiant will house rich analytics of user needs
        - Should Radiant do this? Partner out?
        - Introductory users would benefit from best practice/most common needs
        - Predictive tasking (bulk of requests for X, act accordingly)
    - Unique ability to track requests and provide feedback to donors

End Users

Chair: Gabriele Almon, GIS & Data Analyst Technical Lead, NetHope
Rapporteurs: Meghan Halabisky and Kory VanDyke

QUESTION 1: What can OIN provide to assist with end-user capacity-building in support of the open data such that it will provide?
QUESTION 2: While the OIN focus will be first and foremost on the global development community, it will engage and serve a broad spectrum of users from governments, academics, commercial entities and others. What opportunities do you see for us to grow the user base as it relates to capacity development, thought leadership and community development activities for this broader community?
Please provide specific examples or insights in the following areas:

- Use case analysis
- Internship & Fellowship programs
- Imagery market analysis
- Measuring outcomes and performance metrics
- Open Data License analysis/ thought leadership
- Analysis of commercial costs and why licenses are necessary to support a vibrant commercial sector
- Thought leadership on the remote sensing regulatory environment
- Sponsor hack-a-thons
- Review of R&D in hardware, software and analytics

QUESTION 3: What should OIN look out for to assist specific end-users, not familiar with imagery of GIS enabled tools, to build sufficient in-house capacity, to take full advantage of the data on the OIN platform?
Recognize that a person can be a supplier and an end user at the same time.
Creating a better pool of users that have good ideas but lack the access to come together.
Needs to be practical and less techy in order to reach a new community of users. We don't know what we don't know. Can't expect users to know how the data could be used, but these people still need to be engaged and educated. Dots are not being connected, between how you could use the imagery and what the need is.
Most users can operate the device containing data, but are not proficient enough to edit it.
Many users in remote parts of the world do not have the connectivity to access the data on a mobile phone.
Some users may not need anything more than basic tools.
Group feels that it is impossible for Radiant to reach everybody, but should reach those that are tech savvy.
"Lead a horse to water and make him drink" by showing the users how this could benefit their everyday lives.
Outreach should be multilingual in order to reach everybody.
Consider innovation challenges and microgrants for an aspiring GIS user.
Have a library of algorithms that users could use.
Need to decide who are the users and how far the chain should they go.
Radiant must connect with the enablers/bridgers who have the relationships already developed with the Global South (e.g. Jane Goodall Institute). These bridgers can create the conditions that allow the potential users (maybe a person with some tech experience).
Different between the users and those who could benefit from remote sensing data. If Radiant tried to make it all the way down the user chain it would. Hire more skilled users - local remote sensing specialists. Do not need to have years and years of training. It is not so much that the technical capabilities do not exist, but rather the jobs do not exist. Remote sensing schools in other countries like India. Africa does not have a lack of specialists, but rather a lack of funded

GIS positions with local in-house tools.
GAVI (vaccine platform that the Gates uses) is a good example of how to integrate among types of users. Provides guidance on tools.
Could have a test or pilot with partner agencies (like Goodall Institute) about how to scale up some of the potential applications tools that exist.
Radiant could be a platform that connects disciplines together through a common geography.
May have different uses, but same questions/neds - location of mines.
Others platforms (ESRI, GOOGLE) do not engage with the community and that is what Radiant could bring. They build it and expect users to use it. This does not always happen.
Identifying key decision making frameworks. Need to work with the community to build the tool that can reach the potential users.
We are talking in abstractions. Who is the field worker? It is not tangible, concrete and buildable.
How do we begin to think through this in a different way. Explain what Radiant is by showing what it is. A user-defined, start-up, design could be a useful process in how to build this out.
How do you build the specific user stories to talk about this in more than abstractions?
What is the capacity and appetite to play what type of role? Someone still needs to do that role.
Radiant could group users on needs (conservation, emergency etc..), but be careful of creating silos.
QUESTION 4: What, in your experience, are the concerns of the different end-users in the global development community, towards open data, etc.? How do you address them? What recommendations would you make to engaging end-users into the development of OIN, to ensure their buy-in and endorsement of the OIN mission, and usage of the platform, and the data it supports? We generally talked about - Who are the users?
Citizens will be able to access tools being used by professionals (i.e. health specialists), which will eliminate the need for those professionals.
Important to reach out to people outside of the geospatial community.
There is a whole chain of users: Conventional uses, non-conventional users, & fieldworkers.
Need to engage with those that in the community who know the region, the problems, but may not have the skills or tools.
There is a difference between who are the users of Radiant and who are the potential users/ desired users.
I think you need to reach the lower tech user - have some experience with technology. Maybe they are not too far down the chain.
QUESTION 5: What do you think are the respective merits of incorporating the following into the engagement that OIN conducts with your community:

- OIN Fellowships for members of your organizations/communities?
- Briefings on aspects of GIS Imagery/Open Data/GDC adoption of such tools?
- Forums/Symposiums, other types of public engagement with the work and remit of OIN?

Room Q1 - Would you like Radiant to house your organization's unlicensed data?
Y: 11 N:7
Room Q2 - Radiant will launch a consulting in Year 2, offer the following support to non-profits. Designing RFPs, proposal evaluations, and proof of concept. Is this something you see as valuable?
Y:18 N:3