JECAM (Joint Experiment for Crop Assessment and Monitoring) Science Meeting
Meeting Summary and Action Items[1]
Agriculture and Agri-Food Canada, Ottawa, Canada
21 – 23 July 2014

Monday, 21 July 2014

1. Welcome Addresses and Introduction
Ian Jarvis opened the meeting and welcomed participants on behalf of AAFC (Agriculture and Agri-Food Canada) Director General Denis Petitclerc. The participants all introduced themselves.

2. Meeting Objectives and Update of JECAM & GEOGLAM
Michel Deshayes presented an overview of GEOGLAM, showing the problem of food price volatility, and the response of G20 by initiating AMIS and GEOGLAM. He showed the components of GEOGLAM, and how JECAM handles the coordination of method improvement through R&D. The GEOGLAM web site is at www.earthobservations.org/geoglam.

Ian Jarvis presented a JECAM overview. He showed the evolution of JECAM and how it is now seen as the foundation of the R&D component of GEOGLAM. With GEOGLAM and associated initiatives, the situation has evolved so that we need to be able to share our data, information and science more openly, efficiently and effectively.
Operationally this includes:
- Coordinated, standardized data management
- Need to define in-situ data collection standards to enable intercomparisons
- Need to open up sharing of EO data as much as possible
  - Work with CEOS to define data needs and "push the bar" on open licensing.

From a research perspective, GEOGLAM has presented a number of new emerging priorities/opportunities:
- Use of SAR for areas of the globe with high cloud coverage
- Sampling frameworks for areas where "wall to wall" monitoring is not possible
- Other research questions particular to food insecure nations.

The meeting intends to revise the JECAM Science Plan (key research topics) for injection into the CEOS GEOGLAM Acquisition Strategy.

3. 1st Session: Progress Reports from JECAM Sites
Gérard Dedieu introduced CESBIO (Centre d'Etudes Spatiales de la BIOsphère) and presented the JECAM sites of France (Auradé and Lamasquère), Morocco (Tensift) and Tunisia (Merguellil). A major challenge in France is combining data at local scale to get regional scale

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[1]The presentations for this meeting can be found at http://www.jecam.org/jecam-blog/science-meeting-presentations. This meeting summary does not intend to duplicate the presentations.

information. The focus is both water and carbon. The focus of the Morocco site is water. They compare simulated versus declared irrigation.

Yun Shao presented the Chinese Jiangsu site. They are simulating compact polarimetry mode, which will be available on the RADARSAT Constellation Mission. The SAR is very sensitive to the geometric structure of the crop.

Heather McNairn presented the JECAM sites of South Nation, Ontario and southern Manitoba, both in Canada. They need to show potential to transfer toward operations, and some aspects of SAR are currently operational, others are near-operational. At South Nation, they can compare the benefits of controlled tile drainage with uncontrolled tile drainage. The two sites are very different, and they highlight the need for different solutions in different parts of the country.

Elizabeth Pattey presented the CFIA-Ottawa (Canada) site. They evaluated the performance of STICS in predicting yield and biomass by using LAI retrieved from EO data to re-initialize selected input parameters in 2008 for corn, soybean and spring wheat fields.

Agnès Bégué presented the sites of Madagascar (Antsirabé), Burkina Faso (Koumbia) and Brazil (São Paulo). In Madagascar, field size is very small, 0.03 ha! Cloud cover is a big challenge, and they plan to use SAR next year. In Burkina Faso, they use SARRA-H for modelling; it is simpler than STICS, and was designed for West Africa. They use object-based segmentation and classification to remove the trees from the field images. Regarding the Brazilian site, they produced a map of Eucalyptus plantations, which was validated.

Diego de Abelleyra and Santiago Verón presented the Argentina site. The site has a three year rotation: maize; early soybean; wheat-soybean. So the crop cover changes each year.

Chi-Farn Chen presented the Taiwan site. The site grows two rice crops per year, and the growing cycle is 110 – 130 days. Data from MODIS and SPOT 5 were fused using Spatial–Temporal Adaptive Reflectance Fusion Model (STARFM). They will order RADARSAT-2 data next year.

Nataliia Kussul presented the Ukraine site. They found that classification of crops was more accurate when they used SAR (RADARSAT-2). This is likely because the SAR data is very sensitive to the geometry of the plant, so it is possible to distinguish summer crops from winter crops.

Pierre Defourny presented the Belgium site. 2013 was even more cloudy than normal, so the SAR data was very useful. The Water Cloud and SWAP models could be tested at other JECAM sites before becoming 'best practice'.

Renaud Mathieu presented the South Africa site. They need to focus on yield modeling, small field monitoring (area, crop type & yield), and sampling strategies & statistics.

Agnès Bégué presented proposed one new site (Senegal) and two site changes: Kenya (Murang'a) to replace Tanzania and Brazil (Matopiba/Tocantins) to replace Brazil (Tapajos). Ian Jarvis commented that in the context of GEOGLAM, we need more sites in food insecure

countries. Chris Justice added that we need a generic approach for small-holder countries especially Africa. Therefore, the addition of Senegal is welcome. Agnès said that the reason for replacing Tanzania with Kenya is that the partner in Tanzania is not active, while the partner in Tanzania is very active. The reason to change in Brazil is that the Tapajos site has difficult access and is very cloud-covered, while the Tocantins site is close to the Embrapa Research Center and has availability of field and secondary data.

Bernd Fichtelmann presented the proposed DEMMIN site near the Neustrelitz ground station north of Berlin. DEMMIN is both the acronym (Durable Environmental Multidisciplinary Monitoring Information Network) and the name of the local town!

Open Discussion

This concluded the presentation by the JECAM sites. Ian Jarvis led off the summary discussion by observing that we are making good use of the EO data from space agencies and commercial data providers, although not all JECAM sites are making use of this opportunity. He asked whether we need to revisit the approach of annual updates to the report. Chris Justice replied that we need to show that we are making good use of the EO data, so we need an annual report or similar mechanism.

Pierre Defourny highlighted the exchanges between JECAM sites in Argentina, China and Belgium. Pierre said that we need to feed Best Practices to GEOGLAM. These could include, for example, operational or near operational SAR methods, rice mapping methods, small-holder methods. We aim to develop a Best Practices document. This could, for example, describe how to order SAR data with cross polarization, constant incidence angle, multi-wavelengths.

Heather McNairn voiced concern about new SAR users. She said it is important to know the impact of angles, modes, weather, and other factors. She has seen reports that conclude that SAR didn't work, when she believes they were not using SAR correctly. New users need help. We have enough maturity and consensus to make recommendations. In particular, soil moisture measurement is advanced.

Shin-ichi said that it is good to exchange data, and important to know how to compare results at L, C and X band, or how to use multi-wavelength data sets.

Pierre said that Best Practices are important for ordering and pre-processing, but also for field data. We can work across sites on crop identification, LAI, etc. Candidates for joint SAR work include Manitoba, Ukraine, Argentina, Germany, Tunisia, Belgium. We should also go to the space agencies and convince them to provide the next agricultural mission.

Ian said that there will be a huge opportunity in a few years: there will be five C-band SAR satellites, plus Landsat and Sentinel-2. How will we deal with this volume of data? Gérard Dedieu supports more collaboration. He said that our results now will help to define missions that will be launched about 2025 – 2027. We need to start defining this. We need frequent time sampling, therefore SAR. We also need to define future optical and perhaps TIR (thermal infrared) missions.

Chris said that GEOGLAM has been asked for a meeting on agricultural modelling in the first half of next year. Pierre said that some sites are doing assimilation and forcing of models with remote sensing data.

Pierre talked about guidelines for minimum data sets, and standards for field data collection. We need a common baseline. The JECAM Science Plan should be agreed, and it will be essentially an agreement of key Science questions.

Ian said that his vision of GEOGLAM is broad. The ultimate goal is a system of systems. We are building capacity. We are now working on a MODIS-based medium resolution system, but later it will be high resolution. This will bring in the research questions. The problems of food production in 2050 and beyond are enormous. JECAM is the foundation for R&D in GEOGLAM, not all the R&D. Ian suggested three time steps: Best Practices in the short term, medium term and long term.

Chris asked which applications can be transitioned to operations now.

Tuesday, 22 July 2014

4. 2nd Session: CEOS Space Agencies and Commercial Data Providers

Brian Killough presented SDMS & CEOS Data Access Tools. CEOS member agencies currently operate 118 missions, and 62% of those have open access, in some flavour. COVE is a great tool to determine coincident satellite locations and conduct mission coverage assessments. The ephemeris data is good for a few months out, but shows errors beyond 3 months out. The CEOS SEO is working with Geosciences Australia on a "data cube" concept for enhanced use of Landsat data in Tanzania. The SEO would like to conduct a pilot study with the JECAM team to develop a data services prototype for a few JECAM test sites. JECAM needs to define the test sites, datasets and processing tools.

Andrew Pylypchuk presented the RapidEye mission. The archive tool is EyeFind. Blackbridge is open to flexible licensing. For example, when AAFC buys data from Blackbridge, the single user group is the whole JECAM group. They have an open public user licence available.

Gérard Dedieu presented the CNES missions. SMOS will provide soil moisture globally every three days with 35 km resolution. There will be a Call for Proposals for sites for Venµs this summer, and the JECAM sites could submit a coordinated proposal. A coordinated proposal could also be made for SPOT World Heritage archive and Pléiades data. There will be a SPOT-5 Take-5 experiment from April – August 2015.

Bernd Fichtelmann presented the DLR missions. An AO is expected for the final global DEM in autumn 2014. DLR is planning Crop Cycle/Agriculture in spring-summer 2015. DLR is ready to explore a more coordinated and open approach with respect to JECAM.

Kei Oyoshi presented the JAXA missions. For PALSAR-2, ScanSAR can be used for agricultural monitoring, with GSD = 100 m. There is no open data policy, but data will be distributed among the Asia-Rice team. Each participating country needs a co-PI. JAXA is

talking to Brian Killough about using this data for SDMS. Other agro-met information (e.g. rainfall, soil moisture) is also available (Global Precipitation Measurement, AMSR2, JASMIN, GCOM-C1 SGLI (launch date 2016)) and is currently utilized for the development of monthly rice outlook for FAO/AMIS.

Ian Jarvis presented the DMCii mission update on behalf of Gary Holmes. DMCii has contributed data to several JECAM sites, and they would love to hear feedback from the data users. Sometimes we are not even sure if the datasets are actually being collected from the ftp site. Please let them know.

Brian Killough presented an update of NASA missions. Landsat-7 and 8 together have near global coverage every 8 days, although Landsat-7 is nearing end of life. MODIS provides near real-time data, but is aging and will end soon. MODIS users should review VIIRS for similar measurements. Cross calibration is in progress.

Dean Flett presented the CSA mission update. They are moving science into operations, and are working on the implementation of an EO-based National Monitoring Framework for land surface stakeholders. Dean reviewed the SOAR JECAM mechanism for JECAM sites to access RADARSAT-2 data. He reminded us that SOAR requests are background requests and can be bumped by higher priority orders, such as commercial orders. The RADARSAT Constellation Mission will not be fully polarimetric, but will have compact polarimetry, which will have a wide swath. The intent is toward open data, but there is a commercial aspect that they are working to resolve.

Open Discussion
Pierre Defourny led a discussion of EO Minimum Data Sets. CEOS requested a list of minimum EO data sets for JECAM sites. Pierre reminded us that the purpose of JECAM is to work across sites, therefore some common standards are needed. It was agreed that 1 km data is not useful for agriculture. Brian suggested that the list should not be so long as to scare CEOS. We should add soil moisture/precipitation data. The message to CEOS, he suggested, should be that we are asking for data for evaluation and R&D (not operational), and that the data will be shared across the sites, so flexibility of licences is valued. This is an opportunity to set the bar for future missions. Pierre suggested that we add a column to the table with licence or access mechanism.

Shin-ichi was concerned about asking for data every 10 days at a site. He thinks that is not realistic, and that our requests should be feasible e.g. once or twice per month.

Dean Flett suggested that the table should be structured around imaging requirements rather than mission requirements. This was agreed. Brian and Alyssa have already created a table of imaging requirements, and this can be used as a start. It can be enhanced to show where needs are being met, and where there are gaps.

It was agreed that although we want a minimum standard, we also need to customize the needs of different sites. There is a balance to be struck.

The main audience of this table is the JECAM sites; we are trying to get consensus from the sites. However, it was suggested that we also have a version of the table intended for data providers. The JECAM Guide to Interacting with Data Providers will also be updated.

Six collaborative proposal opportunities have been identified. With better coordination, the data can be delivered to one place, and distributed from there.

Action JECAM-1-1[2]: Pierre Defourny, Ian Jarvis and Brian Killough will re-work the imagery/mission requirements table in the minimum data sets document, using existing tables where applicable. By 31 August 2014. It will be input to the CEOS SIT meeting in September.

5. 3rd Session: Collaborative Initiatives and Opportunities

Shin-ichi Sobue presented the Asia Rice crop team activity for GEOGLAM to improve food security information using EO data at national/regional/global scales. The Asia Rice home page is www.asia-rice.org. To estimate rice crop area, minimum monthly images are required. For production estimates, we need bi-monthly images. A major challenge is the cost of SAR images. Since cost-effective methods are required to estimate monthly/seasonal rice crop production, there is a need to develop technology for sampling/data fusion/data integration.

Jon Styles presented the OPTImisation environment for joint retrieval of multi-sensor RADiances (OPTIRAD). The motivation is to derive physically consistent estimates of surface properties from multiple space-borne instruments. Assimila will make available software and computing resources. In return, they want access to data sets. Users will be able to estimate land surface states and uncertainties, or simulate satellite constellation performance for investment studies. Assimila will need long term data (at least one season) for cal/val. Joint validation experiments are possible, as well as integration of new models.

Pierre Defourny presented the Sentinel-2 Agriculture project, or Preparing Sentinel-2 exploitation for agricultural monitoring. More than 15 organizations ("Champion Users") agreed to remain actively involved in the Sen2-Agri project. Agricultural products were defined based on a user survey. There are currently 14 test sites, of which 10 are also JECAM sites. See www.esa-sen2agri.org. The national sites are not selected yet; the organizers want to coordinate with GEOGLAM in selecting them. JECAM sites can participate, even if they are not selected as Sen2-Agri sites.

Sven Gilliams presented SIGMA. The web site is www.geoglam-sigma.info. The European Commission has made a contribution of 9 M EUR. There are 16 SIGMA sites, of which at least 9 are also JECAM sites. Sven talked about the challenges, and the remark was made that the challenges are common to JECAM, so we need to work together on a common solution.

The next agenda item was Field Data Collection Tools. Bahram Daneshfar presented the ArcPad tool that is used by AAFC. They load Rapideye or SPOT imagery in the background. They can record 400 fields/day – crop type with GPS readings, also categories and sub-categories. There

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[2] Action items for JECAM meetings will be numbered as JECAM-n-m, where 'n' refers to the number of the meeting and 'm' refers to the mth action item for meeting 'n'. Since this is the first JECAM meeting, n=1 for this meeting.

are two people in a vehicle. AAFC is happy to share this tool and the forms, but not the archive, which is for sale. The tablet orients itself to the direction of travel, and this is a nice feature. Pierre said that SIGMA tested and evaluated 24 different applications; none were perfect. They can make the list of the best tools available. Nataliia uses Trek Body; it is an old tool, but easy to use. Pierre proposed that JECAM define the requirements, then circulate and share. The forms should be customized to the cropping environment. Training of field crews was discussed. Bahram said that a few days of training is enough. The training is on crop identification and the use of the tablet. AAFC has a visual manual of crops across Canada.

Action JECAM-1-2: Sven Gilliams will circulate the SIGMA document for Field Data Collection Tools to JECAM sites for comments. Andrew Davidson may add AAFC inputs. By 31 August 2014.

Pierre led the discussion about the proposed standard for minimum in-situ data and collection. (This proposed standard had been sent to participants prior to the meeting.) The definition of annual cropland was discussed; he also discussed the definition of annual cropland from a remote sensing perspective. Pierre proposed that fallow not be considered, since it is not planted; he also proposed that cover crops be included, since they are harvestable even if not harvested. We need a clear definition in order to achieve accuracy and consistency in our measurements. The meeting agreed with the definition.

Pierre went on to discuss a legend definition for crop types and land cover classes. It was pointed out that crop types can change by season, and some countries have multiple crops per year. So this legend is intended to give seasonal crop type, not annual crop type. Ian said that AAFC's users expect something different, but he can map to the proposed legend. Pierre suggested that the name 'crop type' be changed to 'crop class'. Then we can add subclasses for winter or summer; this applies to wheat, barley, etc. Also, rice can have subclasses.

Action JECAM-1-3: Pierre Defourny will revise the crop class definition (legend definition) and validation, and distribute it to the JECAM sites for endorsement. By 30 September 2014.

There was discussion about irrigation. FAO says that if irrigation is not visible, don't classify it. Gérard said that in France, irrigation pipes move; they are not permanent. Ian questioned whether irrigation is important for this legend, since it is land use, not land cover. Gérard said that in dry countries, irrigation is very important. Ian suggested that mapping irrigated/non irrigated area is different from mapping crops; we should keep them separate, then merge them later. Gérard suggested that we add a column called 'farming practice'. Pierre said this column can also deal with transplanted rice.

It was agreed to change 'permanent cropland' to 'perennial cropland', and also to add fallow.

Pierre asked two questions: how to validate non cropland, and are we satisfied with along-road sampling? On the second question, Chris said that the CEOS Land Cover Product Validation Protocol has three levels:
   a. targets of opportunity
   b. systematic

    c. statistically robust.

Level c. is the best but hardest to achieve. 'Along-road' sampling is systematic.

There was discussion of the number of points to sample. Nataliia said that their polygons are very large in Ukraine. Pierre said that the standard recommends 30 samples per crop type and 100 samples for non crop. Bahram said that it depends on the density, and that major and minor crops are different. Andrew Davidson suggested a guideline or range, depending on the homogeneity and whether it is a major or minor crop. Pierre said that if the field sizes are not uniform, we have a problem, and this is often the case. We need to compute the range of sampling densities. This can be done for Canada, Belgium, South Africa, Ukraine, China and Burkina Faso.

The discussion turned to how to complement the validation of non cropland. We should sample the landscape for cropland/non cropland. Pierre talked about global land cover classification based on MODIS/MERIS. Nataliia found it difficult to use. Nataliia said they validate non cropland with ground measurements. Gérard said that in Toulouse, they are working on land cover using high resolution images. Pierre said that the important thing is changes from year to year. We must improve accuracy as time goes on, so we must validate cropland/non cropland.

Pierre proposed to start a JECAM Best Practices Document. He needs other people's contributions. Then we can update the document, and call it version 1. It will be a living document, and will improve with time.

Wednesday, 23 July 2014

6. 4th Session: Agricultural Monitoring Workshop

Byong-Lyol Lee, president of Commission for Agricultural Meteorology (CAgM), World Meteorological Administration (WMO), spoke about Collaborative Strategy with GEOSS from WMO CAgM Perspectives. CaGM is similar to GEOGLAM. GAMOS (Global AgroMeteorogical Outlook System) is limited in scope compared to GEOGLAM, but also covers fisheries and other food sources. The International Conference on GAMOS Alliance for Better Climate Services to Agriculture & Food Security Sectors will be held in Seoguipo, Jeju, Republic of KOREA from 25 – 28 November 2014. JECAM/GEOGLAM participants are invited.

Three presentations were made on SAR Agricultural Applications, the first by Heather McNairn. Heather said that Annual Crop Inventory is operational in Canada, Crop Condition Assessment and Phenology Determination are in research stage, and Soil Moisture is in pilot stage. Compact Polarimetry transmits circular polarization and receives linear. It allows for a wider swath than fully polarimetric modes. Compact polarimetry can increase accuracy and help with noise floor issues. The Soil Moisture Toolkit is embedded in the RADARSAT Tool Box. The Look Up Table can be changed for L or X band.

Yun Shao presented Rice Monitoring using Simulated Compact Polarimetric SAR. She showed an accurate classification into water, crab ponds, forest, urban and two categories of rice (hybrid and japonica). The rice crop can be monitored early in the growing season, and this is important

to facilitate food price stability for regions at risk, and for agriculture exporters, to set the market price. The swath width of Compact Polarimetry is maximum 500 km, the most used mode is 350 km wide. Heather stated that the incidence angle is not a limitation; AAFC uses many angles. For LAI retrieval, the model needs the incidence angle. If the model does not require the incidence angle, you must use a constant incidence angle. One can do an incidence angle normalization, but it is target dependent.

Diego de Abelleyra and Santiago Verón presented the use of SAR images for agricultural applications in Argentina. They used primarily TerraSAR-X and RADARSAT-2. There was no sensitivity to Vegetation Water Content (VWC) in maize from 9.5 to 38 Tn/ha, for both C and X band. VWC is the main variable derived from SAR, but dry biomass is most useful for yield prediction.

Bahram Daneshfar presented Local Sampling to Regional and National Monitoring, an Example from the Terrestrial Monitoring Framework. The sampling framework is based on the National Forest Inventory, except that AAFC uses a smaller grid size (4 x 4 km grid). The object-based crop classification based on Rapideye and RADARSAT-2 has accuracy of crop classes about 95% in some regions. AAFC is interested in partnering with others who have similar interests. This is key for GEOGLAM in areas where wall-wall monitoring is not feasible. This is a framework for extrapolation that will help in the transition to operations.

Brian Killough presented Open Data Sharing Solutions. He showed a table of issues, challenges, solutions and status on the horizontal axis, and search /access /store /process /share /use on the vertical axis. Sven talked about a common data policy, where we could share in-situ data within the JECAM network. We could build on SIGMA (including some JECAM sites) then expand to non SIGMA JECAM sites. It was also suggested that JECAM pursue a User Licence Agreement, starting with one of RADARSAT-2, TerraSAR-X or SPOT/Pléiades, then expand to the others. Brian suggested common sets of processing tools on a common web site. SEO could host in the short term. In the short-medium term, we have SIGMA support.

Some examples of data sharing were mentioned, including the International Soil Moisture Network, the Ag Met group in Florida and the CEOS Cal/Val WG. Shin-ichi said that within the Asia-Rice group, some SE Asian countries don't want to share data. After a few months, they are less sensitive.

7. 5th Session: Lessons Learned and the Way Forward

Agnès Bégué presented Agriculture Monitoring in Countries at Risk: Remote Sensing Challenges. The African JECAM sites represent 6 of the 20 farming systems in Africa. She made several suggestions, such as: stratification will decrease spatial variability within zones. Cropland identification can be done through structure and spatial analysis (object-based image analysis or OBIA). Agnès has a small field model. South Africa is interested in that model, because they mostly work on large fields.

Chris Justice presented a recap of the meeting. He summarized JECAM, and stressed the collaborative aspect of the research. He reviewed the progress of the meeting. Could we do a multi-site SAR experiment on non-rice crops? He reviewed funded bilateral and multi-lateral

experiments. He talked about issues of data access and sharing. He asked the site leads what we have missed.

Pierre identified opportunities with the space agencies for joint proposals:
- CNES – Pléiades
- SPOT 5 Take 5
- Venμs
- Tandem-X DEM
- Rapideye Red Edge studies
- SPOT archive
- SOAR JECAM
- Risat (Asia Rice wants Risat data from ISRO). JECAM could support the request for Risat and AWIFS.

Brian will take messages to the CEOS agencies:
- Proba V (333m and 100m data)
- AWIFS & Risat
- Sentinel-1 early data.

The planning for production of Sentinel-2 is now underway, so the timing may be right to request early data. The Sentinel-2 initial planning did not cover agricultural regions much.

Elizabeth said that climatic and precipitation data is also important.

Ian said that the WMO relationship is critical and he reminded us of the meeting in November. Better coordination is needed.

The ALOS-2 AO is out. There may be an opportunity for a joint JECAM proposal.

Action JECAM-1-4: Shin-ichi Sobue will check on the ALOS-2 AO. By 31 August 2014.

Action JECAM-1-5: Don Ball will check on the possibility of a joint SOAR-JECAM proposal. By 31 August 2014.

Action JECAM-1-6: Dean Flett and Brian Killough will start the JECAM-CSA-MDA discussion, with the goal to achieve a JECAM Data Sharing Policy Agreement. By 30 October 2014.

Shin-ichi suggested that the JECAM/SIGMA sites could be put in the JAXA acquisition planning.

Chris Justice asked Jinlong Fan if it would be possible to get data from the Chinese satellite for JECAM. Sven said that SIGMA will have Chinese data.

Heather talked about Africa. Those sites are high risk, but high reward. High resolution polarimetric decompositions could be interesting. It is hard to get ground data. She can help

with SAR knowledge. Could a post-doc work on this? It needs to be a priority, not off the side of the desk.

Chi-Farn Chen suggested that Formosat-2 can acquire data at national scales. He offered to speak to the Taiwan National Space Program Office (NSPO) about supplying data to JECAM.

Action JECAM-1-7: Don Ball will produce a JECAM boilerplate proposal. By 30 September 2014.

SIGMA is missing some very high resolution data. The red edge should be sensitive to nitrogen content. Some SIGMA sites have Take 5 data, but extension of this would be good.

The JECAM Science Plan is a set of agreed key research topics that will go into the CEOS Acquisition Strategy for GEOGLAM, which is being updated now. The agreed JECAM key research topics are:
- What are the different performing features/metrics to discriminate the cropland/crop type for the different agricultural landscapes (including smallholders' agriculture)?
- What are the limitations to extend the currently operational SAR method for crop mapping, soil moisture and biophysical variables?
- How to develop multisource approaches (sensor independent methods)?
- How to scale up from finer to coarser resolution?
- What are the stratification approaches to move from site level to regional/national level?
- How to detect/focus on change from one year to another (crop type, crop yield, cropland)?
- What are the yield models to be developed in a data rich environment?
- How to input crowd sourcing and expert knowledge into an EO-driven system?
- How to detect water stress (indicators, etc) including thermal IR?

Action JECAM-1-8: Heather McNairn and Pierre Defourny will write a JECAM Document for SAR Acquisition, Processing and Experimentation, including a protocol for cross-site experiments. Potential JECAM candidates for a multi-site experiment include Canada, Germany, Ukraine, Argentina, South Africa and Belgium. By 30 November 2014.

Action JECAM-1-9: Write coordinated JECAM proposals for CNES, SPOT-5 Take 5, Sentinel-1, etc. This will use the boilerplate mentioned above. The proposals will be led by the following:
- SOAR-JECAM: Ian Jarvis
- Formosat-2: Chi-Farn Chen
- CNES: Gérard Dedieu (to be confirmed)
- Risat: Brian will take this to CEOS
- Rapideye: Ian Jarvis and Andrew Pylypchuk
- Sentinel-1: Pierre Defourny.

Ian said that we should approach the CEOS SIT and individual agencies, but always as a coordinated whole. Brad Doorn (NASA) will present GEOGLAM/JECAM at the CEOS SIT meeting in September.

The consensus was that this was a useful meeting. Ian Jarvis would like feedback on whether this type of meeting should be held every year. Ian also asked that anyone who had an interest to host the next meeting to identify themselves. JECAM site leads are encouraged to check the quality of the information for their site on www.Jecam.org. Soon, site leads will be given the ability to change and correct their own data.

Everyone was thanked for their participation, including the organizers. The meeting was closed.

Action Item Summary

No.	Action	Due date
JECAM-1-1	Pierre Defourny, Ian Jarvis and Brian Killough will re-work the imagery/mission requirements table in the minimum data sets document, using existing tables where applicable. It will be input to the CEOS SIT meeting in September.	31 August 2014.
JECAM-1-2	Sven Gilliams will circulate the SIGMA document for Field Data Collection Tools to JECAM sites for comments. Andrew Davidson may add AAFC inputs.	31 August 2014.
JECAM-1-3	Pierre Defourny will revise the crop class definition (legend definition) and validation, and distribute it to the JECAM sites for endorsement.	30 September 2014.
JECAM-1-4	Shin-ichi Sobue will check on the ALOS-2 AO.	31 August 2014
JECAM-1-5	Don Ball will check on the possibility of a joint SOAR-JECAM proposal.	31 August 2014.
JECAM-1-6	Dean Flett and Brian Killough will start the JECAM-CSA-MDA discussion, with the goal to achieve a JECAM Data Sharing Policy Agreement.	30 October 2014.
JECAM-1-7	Don Ball will produce a JECAM boilerplate proposal.	30 September 2014.
JECAM-1-8	Heather McNairn and Pierre Defourny will write a JECAM Document for SAR Acquisition, Processing and Experimentation, including a protocol for cross-site experiments. Potential JECAM candidates for a multi-site experiment include Canada, Germany, Ukraine, Argentina, South Africa and Belgium.	30 November 2014.
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Appendix A - Meeting Participants

Name	Last	Organization	Email
Don	Ball	DB Geoservices	don.ball@rogers.com
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