US ATLAS Physics Analysis Support Task Force
Report to the US ATLAS Research Program Management

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Executive Summary

The US ATLAS Research Program Management formed a Task Force to address the issue of how the US ATLAS community should organize itself to most effectively participate in and integrate into the worldwide ATLAS physics program. The Charge to the Task Force was:

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The issues of physics analysis support are complex, and opinions on how best to facilitate US physicist participation in the ATLAS physics program range from a minimal US support structure to a more complete network of national and regional centers. We would like the task force to address the following questions:

1. What should be the role of a national support center and what functions should it provide? What is the definition of the center (type of personnel, facilities, support)?

2. How many regional centers should there be, how should they be supported and what role would they play in the physics analysis support? We are not asking you to select centers, but to guide us in understanding what would serve US ATLAS needs best.

3. What are the requirements for collaborative tools? Effective communication within the US and with CERN will be critical, and understanding what functionality is needed will be important in establishing standards and guidelines that we can all adopt within the US.

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The Task Force solicited and received input from members of more than 75% of the US ATLAS institutions, considered input from the various reviews of US ATLAS software and computing, and received suggestions from the US ATLAS Management in fulfilling its mission. The Task Force held detailed discussions in meetings spanning several months.

The physics analysis support structure needed by US ATLAS and recommended by this Task Force is one that takes full advantage of the unique resources that are available at the three National Laboratories that are geographically distributed in the US: Brookhaven National Laboratory (BNL), Argonne National Laboratory (ANL), and Lawrence Berkeley National Laboratory (LBNL). The support structure also makes maximum use of the talent that is dispersed throughout the groups at US ATLAS universities.

The recommendations from the Task Force in response to its charge are:

Recommendation 1:

The physics analysis support organization should consist of an *Analysis Support Group* (ASG) and *Analysis Support Centers* (ASCs). The ASG will consist of a group of experts from throughout US ATLAS universities and laboratories. The ASG will work to provide the required software and analysis support to the collaboration via regional interactions at the ASCs and by direct contacts via the web or email. The Group will be led by a Chairperson, chosen by US ATLAS Management, and a Deputy Chairperson nominated by the Chairperson. It is estimated that about 10 FTEs will be required to form this Group. The geographical distribution of these FTEs is to be defined later by the US ATLAS Management.

Recommendation 2:

There should be three regional Analysis Support Centers: centered in the Eastern US (at BNL), the Midwest (at ANL) and in the Western US (at LBNL). This geographical distribution will facilitate access to the ASCs by universities in all parts of the US. The functions of the ASCs will be to:

- Provide office and meeting space and associated support for researchers during collaborative analysis efforts and for training purposes.
- Provide technical assistance to students, postdoctoral researchers, university faculty members, and groups in setting up their local analysis environment.
- In collaboration with universities in the region, organize seminars and training sessions for large groups of researchers.
- Serve as the home base for some members of the Analysis Support Group, contributing expertise to the overall US physics research effort by contributing reconstruction utilities and experts who are rotating members of the Analysis Support Group.
- Establish strong collaboration with the national Tier 1 and the regional Tier 2 computing centers. Examples of this might include providing assistance with and easy access to computing resources and contributing to the data validation efforts at these computing centers.
- Interact with the various ATLAS physics and performance groups.

Recommendation 3:

BNL should function as the coordination Center for US ATLAS physics analysis support. It will have management and support responsibility for the activities of the Analysis Support Group and the regional Analysis Support Centers. The Chair of the Analysis Support Group will have a close association with BNL, since frequent interaction between the ASG Chair and the US ATLAS Research Program Management is foreseen. BNL will also coordinate and support the deployment of collaborative tools for the ASCs and for general use in US ATLAS.

Introduction

The ATLAS experiment at CERN is expected to be among the most likely venues for new discoveries in all of physics. The experiment will explore the fundamental nature of matter and possibly time and space themselves, and the forces that determine their behavior at the energy frontier.

The United States has already played a prominent role in shaping the future of this activity. To date, there are 34 institutions in the US that are part of the ATLAS collaboration. The US ATLAS community has made major contributions to all of the ATLAS detector subsystems and all of the software development for the experiment, in many cases playing leadership roles within the subsystems.

In order to maximize the science return on the considerable investment that has been made, it is essential that US ATLAS physicists be provided the resources to perform the complex data analysis within the overall ATLAS organization of combined detector performance and physics groups. This participation is rather straightforward for those scientists who are resident at CERN; it may present special challenges for those who choose to carry out the bulk of their analysis in the US.

The following objectives were felt to be of paramount importance in the discussions leading up to the recommendations given below:

- The ATLAS experiment is at CERN and there will be a significant US presence at CERN. Close contact between US ATLAS physicists and CERN must be maintained.
- Research must be facilitated by the physics analysis support structure, not managed by it. The distinction between physics analysis and physics analysis support is preserved in this report.
- The physics analysis support structure must ensure good representation and promote visibility of US efforts and young physicists in ATLAS.
- The physics analysis support structure must be flexible to the changing demands of the ATLAS organization and the experimental program.
- The physics analysis support structure should be lean and efficient.

Some of these objectives have begun to be informally implemented. An ASG has started to operate and many colleagues have experienced the advantages that come with it. This analysis support structure allows groups to use the support to different extents. People with different levels of ATLAS experience will utilize different aspects of the ASG support. Examples of how this model is already being implemented in some form are provided in the Appendix to this report.

Analysis Support Organization

Recommendation 1:

The physics analysis support organization should consist of an *Analysis Support Group* (ASG) and *Analysis Support Centers* (ASCs). The ASG will consist of a group of experts from throughout US ATLAS universities and laboratories. The ASG will work to provide the required software and analysis support to the collaboration via regional interactions at the ASCs and by direct contacts via the web or email. The Group will be led by a Chairperson, chosen by the US ATLAS Management, and a Deputy Chairperson nominated by the Chairperson. It is estimated that about 10 FTEs will be required to form this Group. The geographical distribution of these FTEs is to be defined later by the US ATLAS Management.

The Task Force recommends that an organization of Analysis Support Centers (ASCs) be formed to facilitate the participation of US physicists in the ATLAS physics program. An Analysis Support Group (ASG) will coordinate the activities of the Centers. It should be emphasized that the ASG and these Centers do not replace CERN equivalents. On the contrary, one of their functions is to facilitate and improve the interaction of US physicists with the international analysis activities in ATLAS. One of the members of the ASG will be at CERN to help maintain a close coordination with activities going on at CERN. Additionally, each ASC will be represented by a contact person who will be part of the ASG and therefore report to the Chairperson.

Analysis Support Group:

The roles of the ASG are many and will surely develop with time, as the research emphasis and the composition of US ATLAS (and ATLAS) change. The ASG should offer, in broad terms, the following functionality.

- Provide up-to-date information on sub-detector and software components for US ATLAS physicists.
- Maintain up-to-date analysis web pages, especially US ATLAS Tier 1 and Tier 2 specific aspects.
- Provide materials for analysis software tutorials.
- Identify existing (or the lack of) expertise within US ATLAS; establish a network of support.
- Work with US physicists to resolve software, detector or physics problems encountered in their analyses.
- Facilitate communications by holding regular meetings and providing a forum for technical discussions.

The ASG membership includes at least three positions, the Chairperson, a Deputy Chairperson, and a representative at CERN. The Chairperson is appointed by the US

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ATLAS Management. He or she then nominates the other two members. The Chairperson needs to be associated with the coordinating Analysis Support Center (BNL), in a manner similar to other US ATLAS Management positions, but does not need to be a BNL staff scientist. The ASG Chairperson assumes overall responsibility for coordinating the ASG activities and is the contact point with the ASG for interested users in US ATLAS.

The ASG Chairperson, in consultation with the current ASG membership and US ATLAS Management, appoints new members who are then approved by the US ATLAS Research Program Manager. The membership of the ASG should be selected to provide support of critical reconstruction and analysis tasks. Overall responsibility at each ASC will be assumed by a contact person at that ASC; this contact person will be a member of the ASG. The Task Force anticipates that the membership of the ASG will evolve with time as the needs of the experiment and the US collaborators also change and mature. The ASG needs to maintain a list of detector experts, including hardware and software experts. The people on this list can be called upon to solve specific problems. It is estimated that about 10 FTEs will be required in order to form a useful and vital ASG.

Justification for Analysis Support Centers:

The complexity of the ATLAS experiment is such that it is very difficult for any single group, even one at a National Laboratory, to have sufficient expertise to cover all aspects of the experiment. For each physics analysis, one needs to understand in detail the detector response to both the physics signal and backgrounds. This includes the performance of all three trigger levels, the reconstruction, and detector calibration. Depending on the physics topic, the importance of different detectors will clearly vary. However for most analyses researchers will have to understand the performance of multiple systems. Thus broad expertise in the detector and its performance will be needed. The Analysis Support Group will help to supply this expertise.

Personal presence at working meetings and workshops is important for many US ATLAS collaborators. Geographical distance and ease of travel is therefore an issue for US universities. This consideration leads to the geographically distributed approach of Analysis Support Centers described here as the most efficient model for US ATLAS. The presence of visiting researchers at an ASC can extend from a few days to a longer, more permanent period. Graduate students and post docs from university groups could spend a significant amount of their time at these Centers, and will therefore become a part of the expertise described above. The Centers are a clear alternative to sending lots of people to CERN.

There is a general realization that when beam collisions start it will not be possible for many of the US physicists to be at CERN full time. The limitations on being at CERN are: financial (limited US funding to support people at CERN), limited space and infrastructure support at CERN, family obligations, and faculty requirements to teach. Thus it is imperative that US physicists be able to work effectively in the US at their home institution.

The aim of the Analysis Support Centers is to provide a coherent effort in order to bring together the detector performance, software, and reconstruction expertise in the US in support of physics analysis.

Recommendation 2:

There should be three regional Analysis Support Centers: centered in the Eastern US (at BNL), the Midwest (at ANL) and in the Western US (at LBNL). This geographical distribution will facilitate access to the ASCs by universities in all parts of the US.

Regional Analysis Support Centers:

The geographical distribution of US ATLAS institutions suggests that the formation of regional Analysis Support Centers is the best way to support ATLAS physics analysis in the US. The three National Laboratories in US ATLAS (ANL, BNL, and LBNL) are a clear asset to the collaboration. (While this Task Force was not asked to choose regional Analysis Support Centers, it was felt that this fact should be emphasized.) They potentially provide resources that can be used to advantage for physics analysis support. Based on the feedback from the collaboration, many university groups favor this model. Since the expertise is distributed across the country, regional groups may make the most effective use of this expertise. There should be a contact person associated with each regional ASC.

The ASCs will provide support for groups in their regions as well as for those groups and individuals not in close proximity to them but sharing physics interests. So although they are generically referred to as "regional", it is expected that their use will be dictated by the geographical proximity of the institutions in each group and/or their common physics interests. The functions of these regional ASCs include:

- Provide office and meeting space and associated support for researchers during collaborative analysis efforts and for training purposes.
- Provide technical assistance to students, postdoctoral researchers, university faculty members, and groups in setting up their local analysis environment.
- In collaboration with universities in the region, organize seminars and training sessions for large groups of researchers.
- Serve as the home base for some members of the Analysis Support Group, contributing expertise to the overall US physics research effort by contributing reconstruction utilities and experts who are rotating members of the Analysis Support Group.
- Establish strong collaboration with the national Tier 1 and the regional Tier 2 computing centers. Examples of this might include providing assistance with and

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easy access to computing resources and contributing to the data validation efforts at these computing centers.

- Interact with the various ATLAS physics and performance groups.

Recommendation 3:

BNL should function as the coordination Center for US ATLAS physics analysis support. It will have management and support responsibility for the activities of the Analysis Support Group and the regional Analysis Support Centers. The Chair of the Analysis Support Group will have a close association with BNL, since frequent interaction between the ASG Chair and the US ATLAS Research Program Management is foreseen. BNL will also coordinate and support the deployment of collaborative tools for the ASCs and for general use in US ATLAS.

Management:

BNL will have the responsibility for management and support of the activities of the Analysis Support Group and the regional Analysis Support Centers. The Chair of the Analysis Support Group will have a close association with BNL, since frequent interaction between the ASG Chair and the US ATLAS Research Program Management is foreseen. The co-location of the Tier 1 computing center and the BNL ASC will enhance user access to data and may allow for more effective use of some BNL personnel.

Collaborative Tools

The implementation of this model requires careful consideration of how the collaboration will make use of these Centers. Physical presence at any location during many critical periods of analysis may be challenging or may not be possible at all. The Task Force feels that the model proposed will make heavy use of modern technology and new advances in collaborative tools. In order to have a quality national suite of tools available, the coordination and support of collaborative tools for the ASCs will be centered at BNL.

The following are some general recommendations:

- Research groups need high quality videoconferencing systems in the US and at CERN with appropriate industrial standards to ensure US ATLAS physicists can participate in every major ATLAS physics working group, many of which will meet weekly.
- The ASG Chairperson should assign responsibilities to help coordinate collaborative tool equipment selection and procurement and operation, to share

the collective knowledge that has been acquired, and to help reduce communication costs by optimally using IP technology.

- To train new students and researches, the ASG should offer periodic and up-to-date tutorials that are archived and made available in the collaboration.
- Major US ATLAS meetings (or for this matter ATLAS meetings) should be broadcast to allow a large number of US ATLAS members to follow plenary sessions.
- Improve US ATLAS web pages so that information can be easily found and is kept up to date.

Metrics with Which to Gauge Accomplishments

A list of metrics should be established to provide a measure of the effectiveness of the ASG/ASC analysis support organization. As the objective of the model is to support physics research, it is difficult to develop a clear and objective set of metrics that is easy to quantify. Since the aim of the support structure is to enable US physicists to participate effectively in ATLAS physics analysis, the Task Force proposes the following metrics:

- US participation in ATLAS Physics and performance working groups.
- Leadership roles played by US physicists in ATLAS Physics and performance groups.
- US contribution in reconstruction and subsystem software.
- US participation in ATLAS Physics weeks.
- Center utilization – e.g. number of tutorials, number of visitors.

Implementation

This Task Force recognizes that the US ATLAS Management must discuss the recommendations in this report with the management at the National Laboratories in order to negotiate the resources needed to implement the model. The Task Force suggests that the US Management evaluate annually the effectiveness of the model described in this report after it is implemented.

Appendix

Presented in this Appendix are a few examples that illustrate the operation of the Analysis Support model described in this report. The examples are based on existing efforts in the US.

- BNL physicists already work closely with the Tier 1 facility to ensure the accessibility of data. For example the DC2/Rome MC data was made available at BNL, as was CPU time for user analysis activities.
- ATLAS physicists have come to BNL to discuss possible physics analysis projects that might contribute to ATLAS software and/or detector performance studies.
- The Analysis Support Centers host a limited number of faculty, post docs and students. As an example, one US ATLAS collaborator is spending his sabbatical at BNL this year and has benefited from the interaction with local experts and facilities. US ATLAS benefited from his muon support role. (This person has a major responsibility in ATLAS for coordinating the MOOR Muon reconstruction).
- Electron-photon-identification (e/gamma) activities started with a working meeting at BNL, in which the topics of interest to US groups were identified, in consultation with the CERN e/gamma convener. It was then followed up with visits by university professors and their postdoctoral researcher to BNL, monthly phone meetings to ensure progress, constant interaction with the scientists in some of the university groups, help to US physicists giving talks at ATLAS meetings, and connections to other ATLAS groups working on the same project.
- BNL physicists have gone to a number of universities to give customized tutorials. This activity has continued with tutorials being given at US ATLAS physics meetings and the tutorials have formed the basis of others whose focus is the use of the Tier 2 computing facilities.

Regional groups are already active in US ATLAS.

In the Midwest, the US ATLAS Midwest Physics Group has been active for approximately 12 months and comprises a collaboration of physicists from nine institutions. The group activities include:

- A web site to maintain pointers to more commonly needed information on software, datasets, meetings, and physics interests.
- The organization of regular physics meetings (a total of eight in the past year). The location of these meetings has rotated among the collaborating institutions and considerable use has been made of ad hoc video conferencing to provide access to individuals whose schedules preclude their participation in person.
- Preparation of condensed datasets at the University of Chicago/Indiana University Tier 2 computing center for general use.

- Individuals in the group have provided hands-on tutorials developed explicitly to deal with the software environment at the UC/IU Tier 2 computing center as well as address specifics relating to the BNL Tier 1 computing center and CERN. They have also produced example analysis scripts and have good contacts with many software experts.
- The group as a whole has strong connections to several ATLAS reconstruction and physics groups (Jet/E_T^{miss}, Higgs, SUSY, Standard Model) as well as participants from two major ATLAS detector systems (Trigger/DAQ, Tile Calorimeter).

More details can be found at http://hep.uchicago.edu/atlas/usatlasmidwest/.

These examples illustrate a somewhat dynamic model that suits individuals and groups with different needs. They clearly indicate the broad geographical distribution of expert knowledge at laboratories and universities in US ATLAS.

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Review Committee Report
US ATLAS Analysis Support Model Review of January 4, 2007

The US ATLAS Research Program Managers initiated a review of the analysis support activities on January 4, 2007. The review agenda and slides from the talks may be viewed at http://indico.cern.ch/conferenceDisplay.py?confId=10284.

The Review Committee members participated in the review either in person, via ad hoc video conference, or by phone. The Committee members discussed their findings through email exchanges and phone conference calls during the week following the review. All members of the Committee agree with the findings in this Report.

This Report provides a review of the US ATLAS Analysis Support Model utilization by the collaboration during the time from March 2006 when the support structure was formally put in place, and the time of the review. It includes a description of the goals, the findings, and recommendations for (i) the Analysis Support Centers (ASCs), (ii) the Analysis Support Group (ASG), and (iii) the Analysis Forums (AFs) in US ATLAS. Additionally, there is a set of recommendations on what might be useful metrics to provide a measure of the analysis support structure effectiveness. Finally, a set of general comments includes additional observations and recommendations.

The Review Committee kept in mind that there are some analysis issues that are ATLAS wide and not just under the US purview: changing software releases in ATLAS (what works today may not work next week), data from a large complex detector that results in software that is complex and in some cases not so transparent. This report is restricted to be a review of only the US ATLAS analysis support effectiveness during the period of time given above.

Analysis Support Centers:

There are three regional Analysis Support Centers: one at Brookhaven National Laboratory (BNL), one at Argonne National Laboratory (ANL), and one at Lawrence Berkeley National Laboratory (LBNL). The geographical distribution facilitates access to the ASCs by collaborators in all parts of the US. Their function is to provide office and meeting space to collaborators, host US ATLAS and ATLAS personnel that can provide technical assistance to US ATLAS groups in performing their analysis, be a regional site for organization of seminars and training sessions for large groups of researchers, and serve as a home base for some members of the ASG. The ASCs should facilitate strong collaborations between the Tier 1 and Tier 2 computing centers and with various ATLAS physics and performance groups.

Findings:
There is an ASC Coordinator at each site: Ma at BNL, LeCompte at ANL, and Loken at LBNL. An Advisory Committee has been formed for each of the three ASCs which will write a yearly report on its activities. There have been six Analysis Jamborees held at the ASCs since they were formed in March 2006, three at BNL, two at ANL and one at LBNL. The web sites with information on each of these meetings may be found at

http://www.usatlas.bnl.gov/twiki/bin/view/AtlasSoftware/PastUSMeetings.html.

Each ASC's Jamboree has had a slightly different format in order to meet the needs of the community. A fair number of experts were present and a varying number of software tutorials were given at each meeting. A lot of work was done in small groups. In addition to the Jamborees, there have been several instances of smaller groups or even individuals using the ASC infrastructure and personnel expertise to assist them in performing analysis in ATLAS.

Up to now, a good deal of the time in these Jamborees has been devoted to introductory tutorials and instructions for beginners on how to set up the software and begin analysis. As anticipated, the ASCs Jamborees are moving away from a format aimed at beginners towards more advanced topics and activities, especially in preparation for the ATLAS CSC notes. We expect support at the introductory level will increasingly be provided locally at each institution. This dynamic evolution at the ASCs is encouraged.

There is unanimous agreement in the material presented to the Committee that the Analysis Jamborees have been successful and very well received by the collaboration. They are well staffed and suit the needs of the visitors. All surveys taken by the ASG Chair give very high marks for the Jamborees.

Recommendations:
1. The Review Committee as well as many in US ATLAS anticipates that the needs of the collaboration will change as we come to LHC turn-on. The ASCs should remain dynamic and responsive to the needs of the community. For example, there may be a need for longer term visits by students and postdocs at the ASCs.
2. The ASC Coordinators should take responsibility to ensure increased integration with the AFs and the ASG. ASG members should be encouraged to participate in all Jamborees and relevant AFs.

Analysis Support Group:

The ASG consists of a group of experts from throughout US ATLAS universities and laboratories. The ASG is meant to provide the required software and analysis support to the collaboration via regional interactions at the ASCs and by direct contacts via the web or email. The ASG is led by a Chairperson, Stephane Willocq.

Findings:
The ASG has been formed and is well staffed. The Review Committee is unanimously pleased and impressed with the performance of the ASG Chair (Willocq) in executing the Task Force recommendations. The ASG membership may be found at http://www.usatlas.bnl.gov/twiki/bin/view/AtlasSoftware/AnalysisSupport. There are clear examples where the community has made great use of ASG members at the ASCs and where ASG members have visited universities to provide one-on-one assistance in person to US ATLAS collaborators. However the Review Committee feels that in general the ASG has been underutilized by the full US collaboration. The community seems to be unaware of the ASG composition, in general. It appears that many physicists

in the collaboration do not understand the purpose of the ASG, to rapidly respond to users' software problems. As a result of the ASG underutilization, this great resource has not been used to assist US ATLAS in reaching its full potential. It is clear to the Review Committee that the ASG personnel are responsive to requests from the community in the cases where this took place; however the US ATLAS collaboration has not, in general, asked for ASG help in the way it was envisioned by the Task Force.

An additional concern for the Committee is the extent to which some ASG members, in cases where their expertise is being used, might get overburdened with support activities (emails, phone calls, visits from collaborators). The ASG members represent (by construction) some of the best experts in specific fields who should be able to devote time to continue to contribute to the overall progress of ATLAS. There should be a mechanism for ASG members to rotate off the group and be succeeded by well-trained newcomers.

Recommendations:
1. The ASG members need to be proactive in fulfilling their mission to assist US ATLAS members with analysis support.
2. The ASG Chair should ensure that the entire US ATLAS collaboration is made aware of this resource. The Committee is encouraged by the recent email from the ASG Chair to the entire collaboration informing them of this resource.
3. ASG members should make a greater effort to attend the ASC Analysis Jamborees and relevant AF meetings. This will help them to become better known to the community.
4. The ASG membership should be reviewed periodically to ensure that the top quality people in the collaboration are not so swamped with support activities that they cannot perform their own physics analysis.
5. Deploy HyperNews expeditiously. It will provide a searchable record of questions and answers, and it will enable more knowledgeable users to help answer questions, thus reducing the burden on this group.

Analysis Forums:

The physics analysis support structure, including the AFs, was meant to ensure good representation and promote visibility of US efforts and young physicists in ATLAS. The AFs were meant to be a vehicle for groups in the US with common physics interests to meet and discuss their analyses. The meetings should have a working character where people can present detailed aspects of their work and get feedback from experienced people.

Findings:
Information on earlier AF meetings may be found at
http://www.usatlas.bnl.gov/twiki/bin/view/AtlasSoftware/PastUSMeetings.html   and   at
http://indico.cern.ch/categoryDisplay.py?categId=296. There is substantial variation between the AFs in meeting frequency, attendance and impact on overall ATLAS. Some of the AFs have met relatively frequently (e.g. e/gamma) and the tools developed have

been presented in ATLAS meetings and propagated to the official software. At the other extreme, some forums have never been convened. The original need for the AFs, to serve as a discussion forum where work can be discussed at a much more detailed level than in the corresponding ATLAS physics or performance group, has to a large extent been fulfilled by the CSC working groups. The AFs could remain very useful however, depending on their usage and goals, and do have the advantage of holding meetings during the work day across North America. One approach could be to focus US efforts on specific topics, such that in overall ATLAS the US is recognized as having produced that result and as the center of expertise. As a possible example for illustration, in hadronic SUSY analyses, what generators are available for the enormous QCD backgrounds? What are their advantages and disadvantages? What are the big uncertainties (ISR, gluon pdfs ...) in the generators that early, relatively low luminosity data can address? What studies could help us plan for those analyses? A focused effort could yield a real statement on this topic rather than the loose studies occasionally seen in ATLAS so far. In every major analysis topic, there are such broad issues that can be presented and discussed, with subprojects spun off to someone new.

Recommendations:
1. The AF Conveners need to be proactive in getting US ATLAS collaborators engaged in these activities, not waiting to be contacted by collaborators who may not even know of the activity.
2. The needs within ATLAS will certainly change as the collaboration moves beyond the CSC note activity to LHC turn-on and beyond. The AF conveners need to be proactive in responding to these changing needs.
3. Meetings need to be convened on a regular basis, even if attendance is poor or spotty. Meetings need to take place at the Jamborees to give people an opportunity to meet face-to-face and become better known to the community, especially the students and new postdocs.

Metrics:

The Review Committee discussed possible means of developing metrics to evaluate the effectiveness of this analysis support model. While there was general agreement that this model is quite suited to the needs of US ATLAS if utilized properly, there was no obvious set of metrics in all cases. However, the Committee does offer the following suggestions.

1. Surveys of each Analysis Jamboree should be taken, as is being done already. There are quantitative measures of success at each ASC for every Jamboree that was made available to the Review Committee. In each case, the satisfaction with the Jamborees and the ASCs were very high.
2. Track the numbers of phone calls, emails, and personal visits by each ASG member per month.
3. The extent to which software developed in the US via this support structure gets adopted in ATLAS should be assessed.

4. Make a survey (through the IB) to evaluate how many institutions would like support but are not getting it, and why. This should include those who have not interacted with the support organization so far.

General comments:

The US ATLAS analysis support structure appears to be lean and efficient and complements efforts that already exist in ATLAS. Most of the ASC personnel and the ASG membership provide their services to the collaboration without compensation for their work. (Some ASG members are paid by Program funds to do other work, but also provide this service to the community.) The Review Committee is pleased to see that each ASC will add at least one-half of an FTE to support the analysis effort in the US over the next several months. The Review Committee only has anecdotal knowledge of the structures put in place in other large countries. It would probably be useful to make a more detailed assessment of those and their effectiveness as compared to the US ATLAS model.

By design, this analysis support structure is meant to be available to the US ATLAS users that want to take advantage of it, but is not meant to be imposed upon any individual or group in the collaboration. There are 400 people currently in US ATLAS (faculty, senior scientists, postdocs, graduate students; actual heads, not FTEs). It appears that in every case where this analysis support resource is used, the response by the collaboration has been very positive. The Review Committee did not get input from groups NOT using this resource to determine whether this is by choice or not. It is clear that the model is working and should not be abandoned. This analysis support structure has been in place for only 10 months so it is too early to assess its full effectiveness to the community. As more members learn of the full extent of this resource, the Review Committee anticipates that it will be more fully utilized.

The committee recommends continuation of the software distribution support to the Tier3 facilities located at the collaborating institutions. Such facilities may become important for quick turn-around debugging of the programs before submission for major data analyses, for the operations of the interactive graphic packages and for small, local projects involving undergraduate students using ATLAS software but without a need for GRID and security certificates.

The Committee has insufficient information to assess if US ATLAS members resident at CERN are receiving adequate analysis support, either from ATLAS or from US ATLAS. It would be useful to have a better understanding in this area.

The analysis support needs of the US ATLAS community will only grow over the next few months. There is the cosmic ray running period, followed by LHC turn-on, followed by the first physics run next year. The migration from the Tevatron and other experiments is in full swing. The ASG Chair and the ASG members, the AF conveners, and the ASC leadership must be proactive and anticipate these needs to ensure optimum US contributions to ATLAS. This model needs to remain dynamic in order to be effective.

Appendix 1: Review Committee Members

1. Keith Baker   Yale University
2. Gustaaf Brooijmans   Columbia University
3. Mel Shochet   University of Chicago
4. Ryszard Stroynowski Southern Methodist University
5. Charles Young   Stanford Linear Accelerator Center

Appendix 2: Charge to the Review Committee

The U.S. Analysis Support activities have been launched. This has 3 main ingredients -

- the three Analysis Support Centers (ASCs)

- the Analysis Support Groups (ASG)

- the various analysis forums.

Details of the Analysis Support activities area can be found at:
http://www.usatlas.bnl.gov/twiki/bin/view/AtlasSoftware/AnalysisSupport.

We will have an informal mini-review of the U.S. Analysis Support activities to understand how well this effort is being carried out. Is our analysis support effective and responsive to the needs of U.S. physicists, both in U.S. and at CERN? Will there be adequate support during all phases of the experiment? Have the broad guidelines suggested in the task force report been followed? Is the organization, staffing and the activities at the support centers sufficient? Are the organization and the activities of the ASG and the analysis forums providing an appropriate and sufficient environment to promote U.S. Physicist involvement in LHC physics?

The review committee will identify the aspects of the analysis support activities that need further strengthening and provide new input based on the experience gathered in the past year. We also suggest that the committee carefully look at the metrics defined to measure success/progress and suggest additional metrics if necessary.

US ATLAS Analysis Support Survey

- **Request for feedback**

  - **Al Goshaw's email to US ATLAS IB sent on 25 Jan 2010**
    https://lists.bnl.gov/pipermail/usatlas-ib-l/2010-January/000263.html

  - **Follows reports by Jim Cochran to US ATLAS Dec 09 & Jan 10 IB meetings**
    http://indico.cern.ch/getFile.py/access?contribId=0&resId=1&materialId=slides&confId=76642
    http://indico.cern.ch/getFile.py/access?contribId=1&resId=1&materialId=slides&confId=82291

  - **Concern about lack of involvement in early data analysis by US ATLAS physicists based in the US**
    → polled institutes to collect feedback about current experience with computing, software, analysis, documentation, etc.

  - **Feedback received (via email or conversations) from the following 21 institutions (total of 25 responses):**

    - **ANL, BNL, Boston U, Brandeis, UC Irvine, UC Santa Cruz, Columbia, Duke, LBNL, New Mexico, NYU, Ohio State, Oregon, Pittsburgh, South Carolina, Stony Brook, UT Arlington, UT Dallas, Tufts, UMass, Yale**

    - *We are still interested in getting feedback from other institutions!*

Survey Responses

1. Computing infrastructure

Is your group relying on Tier 1, local Tier 2, Tier 3 or grid resources?

primarily grid+T3, some T1 & T2, 3 groups indicate problems with grid

Have they been readily available?

14 yes, 5 have grid problems, 1 doesn't yet know

CERN grid site issues (data could not be retrieved from it) or "hard to find a good grid site"

2. Data access

Has your group been able to find and access the datasets needed for analysis?

18 yes, 1 has problems

3. Data analysis practical guides

Has your group been able to find appropriate documentation to support your analysis efforts?

13 yes, 1 no, 2 mixed, 2 hard, 1 "documentation terrible"

Survey Responses

4. US analysis support

Did your group participate in a jamboree at one of the Analysis Support Centers (ASC) recently?

13 yes, 7 no

Does your group make any use of the Analysis Support Group (ASG)?

4 yes, 14 no, 3 rarely

Does your group participate in any US Analysis Forum?

8 yes, 12 no, 1 "not aware"

Are there any particular issues which your group would like to be addressed at a jamboree, a forum or by the ASG?

8 yes (various suggestions), 11 no

Is the documentation relevant to US ATLAS Resources adequate?

10 yes, 3 no, 2 mixed

Strong correlations between first 3 categories

Survey Responses

What is your group's main source of analysis support? (Group member, non-US ATLAS collaborator, ASC member, ASG member, email list, wiki, etc.)

mixture of all: 19 group member, 13 collaborator, 10 email, 7 twiki

5. Overall information about releases, datasets

Was your group able to identify good runs (data quality and run conditions) as well as good software releases, etc?

17 yes (2 qualified), 3 mixed, 1 has problems

Generally, is your group able to find the necessary information?

15 yes (1 qualified), 4 hard

Selected Feedback

Does your group participate in any US Analysis Forums?

"We have not participated in any of the original Analysis Fora (SM/top/Higgs/QCD) and are not even aware of any recent meetings of these groups. (e/gamma is the notable exception.) I am not sure that those groups still serve a purpose, and I think we should encourage US physicists to contribute directly to informal meetings that take place in the larger ATLAS context."

jc - Forum conveners are indeed to serve as liaisons to CERN-based groups

Are there any particular issues which your group would like to be addressed at a jamboree, a forum or by the ASG?

"Distribute them more geographically. We had very few (only ad hoc ones few years ago) in the South."

Selected Feedback

Generally, is your group able to find the necessary information?

Group #1: It's not easy to keep up w/ the releases, too many of them. But that's a general ATLAS / physics group issues. It would help if recommended releases for mc/data/ reprocessing etc.. be advertised including main core code changes to reconstruction etc..

Group #2: CERN wiki pages on data quality and data preparation are the main sources of information. But to keep up to date with the analysis, one has to participate in the working group meetings, where the latest developments are discussed.

6. Any other comments/concerns/suggestions?

The main computing and software infrastructure allowed people to do analysis in US as the data came. We have helped people process large amount of datasets at T1, including access to the latest software release, raw data and up to date conditions data. We hope this will continue. What can be improved may be for the US based people to be more aware of the latest activities at CERN and identify the urgent and hot analysis topics to be carried out ?

A lot of these problems can only be solved at the level of US ATLAS physics support. We are lacking:
1. An efficient way to get the technical information needed to proceed with analyses.
2. A good communication into the ATLAS (not US ATLAS) physics groups.

→ US ATLAS Physics & Performance Monday meeting is useful for this

General Observations

- **Computing resources**

  - Generally OK

  - Progress with the grid (many users now) but some grid sites still not "up to snuff"

  - Many more Tier 3 resources coming online later this year

  → important to provide documentation and support specific to T3

  - Getting or renewing grid certificates not easy enough

- **Documentation**

  - Generally OK

  - Good for newcomers (combination of workbook, wikis, tutorials)

  - Lacking a bit for more advanced topics (e.g. grid certificate issues or framework questions)

  - Concern is how to find the right information

  + poor "searchability" for e-groups and protected twikis

  → need high-level guidance (e.g. WG convenors)

General Observations

- **Analysis support**

  - Most groups rely on own experienced people for training + connections to other collaborators for more expert questions via email list or private email

  - Some groups still rely and benefit from jamborees

  - Other groups feel they no longer need jamborees and go directly to CERN or the relevant expert for support with more advanced issues

  - Documentation and active email list support important (DAST is good example)