Restructuring UW for the Future Recommended Action: Consolidation of Physics, Astronomy, and Atmospheric Sciences

UW 2-13 Review Committee for the Consolidation of Physics, Astronomy, and Atmospheric Sciences

Submitted to Provost Carman on October 1, 2021

Committee Members
David Mukai, Chair
Jeff French, Atmospheric Sciences
Chip Kobulnicky, Physics and Astronomy
Shane Murphy, Atmospheric Sciences
Adam Myers, Physics and Astronomy
Tom Peterson, Advisor to the President
Phil Wille, General Counsel

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Executive Summary

(Limit to 250 words)

Both departments are enthusiastic about the merger but have concerns about the logistics of the reorganization and many unintended consequences. There is a general concern that the committee's work was done in a compressed timeframe. Thus, before any actions are taken, new department procedures that incorporate faculty and staff input and that share governance with faculty and staff should be established. With this caveat, the following is a summary of the proposed actions of the committee:

1. Consolidate the current Physics and Astronomy Department and the Atmospheric Science Department into one Department in the new College of Engineering and Physical Science.
2. Appoint one Department Head over this new department.
3. Maintain the units outlined in the proposed organization chart. These include: Physics and Astronomy faculty (tenure track and non-tenure track), Atmospheric Science faculty (tenure track and non-tenure track), King Air Facility, UW Flight Center, Class Lab Program, NASA WY Space Grant, the Wyoming Infrared Observatory, and the Planetarium.
4. Keep all Faculty Positions (budget cut to be managed by the new College of Engineering and Physical Science).
5. Keep all Staff Positions (budget cut to be managed by the new College of Engineering and Physical Science).

The committee cautions that the details behind these proposed actions are complicated and there are many potential pitfalls (outlined in this report). Implementing these proposed actions will take thoughtful deliberation and time. Also, it is reasonable to expect that there will be a substantial transition period where all units will not be as efficient as they were prior to the consolidation. However, this consolidation positions the new department to be successful into the far future.

Benefits

(Limit to 1 page)

The benefits of the merger are listed below as research benefits, educational program benefits, and other benefits. A complete listing of benefits of the merger is in Appendix A.

Research Benefits

- The combined department will have a strong link to the new School of Computing (SoC).
- P&A consists of two separate research units in a single department (Astronomy and Condensed Matter Physics) and the addition of a third unit should be relatively straight-forward.
- ATSC currently has no undergraduate program at UW, and because of this current recruitment of graduate students is almost entirely external (non-UW). With the merger there will be a natural pipeline for good UW undergraduate physics students to enter the ATSC graduate program.

Educational Program Benefits

- There is a potential for students to enter all permutations of Physics, Astronomy, and Atmospheric Science BS/MS Quick Start programs (Physics BS/Physics MS, Physics BS/Astronomy MS, Physics BS/Atmospheric Science MS, etc.)
- There could be synergy between the two departments teaching courses in each other's units.
- The B.S. in Astronomy & Astrophysics is essentially the physics B.S. plus 4 astronomy courses. With relatively little new faculty support, it would be possible in the future to create a similar B.S. in Atmospheric Physics.
- More immediately, an undergraduate minor in Atmospheric Sciences could be developed.
- Some MS electives in the two departments could be merged.
- Physics faculty could teach classical mechanics (Engineering Science) courses in CEAS.
- If needed, ATSC graduate students with strong Physics backgrounds could possibly help TA Physics courses.
- P&A faculty could teach courses that would benefit ATSC graduate students, adding expertise that currently does not exist in in ATSC.

Other Benefits

- The department cultures are similar: both departments are research-active and able to recruit strong graduate students.
- The merger would create a larger pool of specialized skilled technical and engineering personnel support (e.g. UWKA and WIRO). The merger of the two departments may make it easier to maintain certain technical skills and equipment and build a shared pool of technical capabilities. For instance, P&A has 1 Ubertech.
- The merger would bring the ATSC unit closer to the NASA-EPSCoR Space Grant Consortium, which is housed in Physics.
- There is the possibility of ATSC collaborating with A&P in their STEM externally funded summer camps.

Organizational Restructure

(Limit to 3 pages plus org chart)

The philosophy adopted for creating the new organizational structure was to preserve as much of the existing structure in the two departments as possible. The results are shown in Figure 1.

This organizational structure addresses the need to position UW for the future and to respond to a significant reduction in the university's budget. This structure enhances synergism between Physics and Astronomy and Atmospheric Science as outlined in the benefits section. Combining the departments sets the groundwork for the growth of the programs for 21st century themes, incorporates moderate efficiencies, and better positions the University for R1 research classification. The new unit can provide economic support to the state of Wyoming. Each of these statements are elaborated below.

Responding to Reduction in UW Budget

In the most recent update on the reorganization efforts, it was announced that individual department budget targets can be managed at the college level. Communications with CEAS Dean Cam Wright have indicated that all CEAS reductions can be managed at the college level through attrition. Thus, there is no need for reduction in faculty or staff to achieve the target 3% cuts for the merged department.

Discussions with CEAS Business Operations Director Megan Barber indicate that all state-supported staff in both Physics and Astronomy and Atmospheric Sciences can be preserved. In fact, these staff are essential to the operation of the existing and proposed merged departments. The funding of staff is a particularly important and complicated issue. Ms. Barber has been in discussions with her counterparts in A and S to understand how staff are funded and we have assurances that these models can continue in the merged units.

Additionally, many staff in both units are supported on soft money and are not part of the proposed budget cuts. For example, the King Air unit is an NSF research facility and the majority of personnel associated with this unit are supported on soft money.

The bottom line is that we anticipate that no cuts will be made to faculty or staff in the new merged unit.

Synergism

As described in the benefits section above, the synergies between PA and ATSC include:

- Both units do computational research that can fit in with the new School of Computing.
- Some elective courses are similar or are duplicated at the master's level between the two departments and could be merged.
- It might be possible for faculty to teach courses in each other's department.

- There could be strong synergies between the two units' technical support staff. Specifically, both units conduct instrument-heavy externally funded research, requiring skilled technical and engineering personnel support.
- PA could teach courses that would benefit ATSC graduate students in areas of expertise that are not currently in ATSC.
- Merging the departments paves the way for ATSC to potentially develop an undergraduate major.
- Merging the departments affords the possibility of ATSC contributing to PA's well-established STEM outreach activities.

Positioning for 21st Century Themes

The section on Academic/Discipline Specific Expertise outlines how both departments already are aligned with 21st Century Themes. For example, the departments align with the following topics in the United States Innovation and Competition Act of 2021 currently under consideration: Title VI – Space Matters, Part III – Science and Title VI – Space Matters, Part VI – STEM Engagement. Other examples are the King-Air program and the Wyoming Infrared Observatory, both of which are nationally funded research facilities. More details of these and other efforts are described below.

Efficiencies

The operational efficiencies of the merger are moderate at best. Perhaps this is because staff are already tasked at capacity due to past budget reductions. One area where operational efficiencies are possible is among the highly skilled technicians and engineers in both units.

R1 Classification

As both units are already strongly research-intensive, they have been and will continue to contribute to the University's efforts to achieve R1 Classification.

Economic Support to Wyoming

In addition to strong nationally funded research efforts, activities within the departments support Wyoming, and the merger will enhance these efforts. Faculty and students in both departments work with the School of Energy Resources. For example, the SER Center of Excellence in Air Quality is led by faculty from the Department of Atmospheric Science. This Center of Excellence interacts with numerous oil and gas companies within the State and region to develop mitigation strategies for emissions. Atmospheric Science faculty are currently involved in multiple funded SBIR/STTR projects to commercialize instrumentation that was developed in the department. Also of particular relevance to the state are water resources. ATSC has a long tradition of research in clouds, precipitation, and even cloud seeding to enhance water availability in the future. This expertise includes air pollution, cloud and precipitation research, and greenhouse gas emissions. This work in Water research is highly interdisciplinary across colleges, and will continue to be a strength in the merged department, especially in terms of water and air quality research.

Draft Physics, Astronomy, and Atmospheric Science Organization Chart

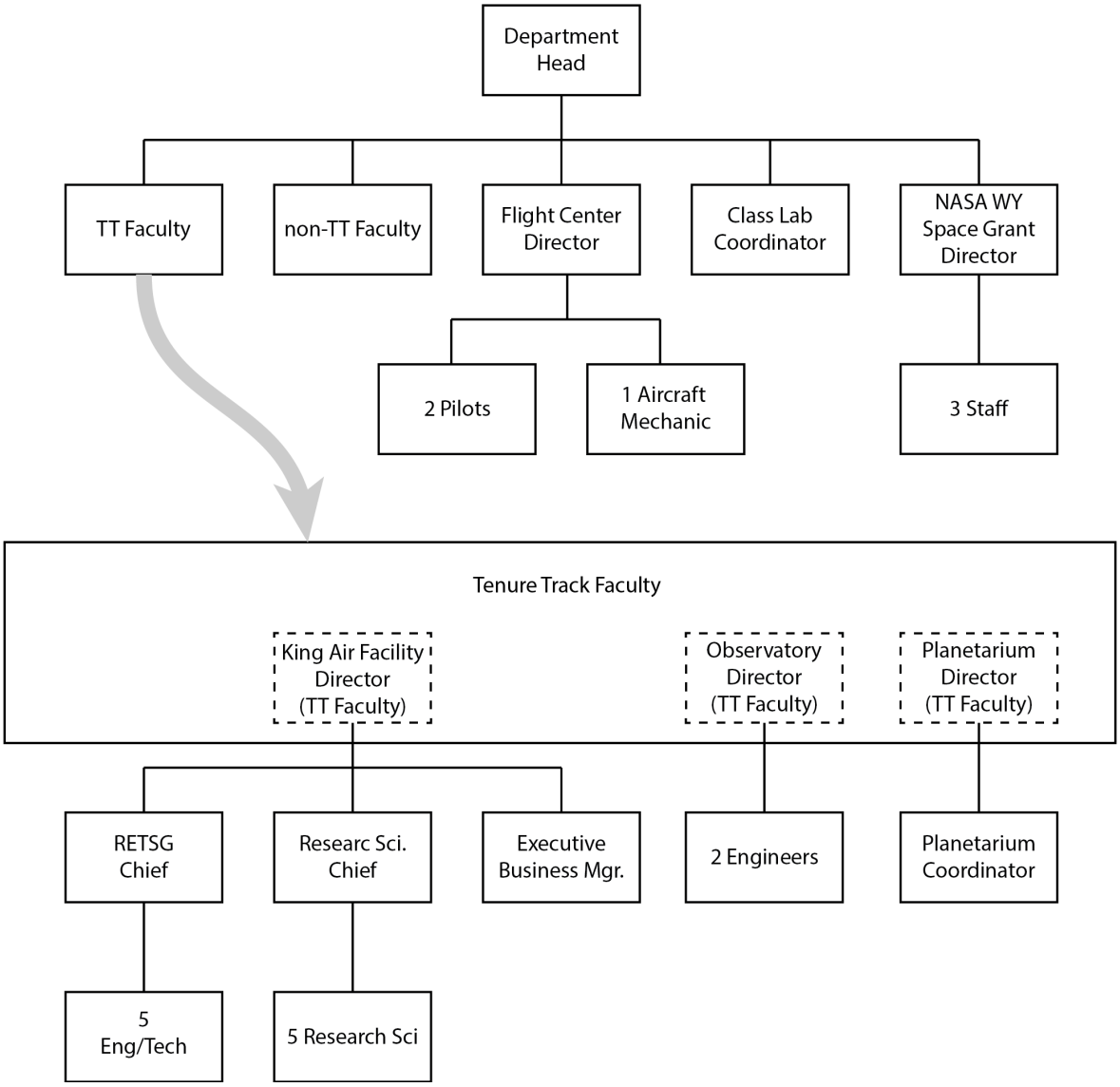

Figure 1. Proposed Organizational Chart

Efficiencies

(Limit to 1 page)

It is almost certain that a work-load audit of staff will reveal that consolidating staff positions is not possible. This is further complicated by some staff being State supported and others being supported on soft money.

However, it might be possible to gain minor efficiencies by reshuffling duties. The following examples are provided as illustrations and may not be more effective and must certainly be examined in more detail.

- Perhaps divide business manager duties into external grants and internal funding.
- Perhaps divide office associate duties into graduate and undergraduate issues.
- Perhaps consolidating O&M, IT, utilities billing and the like will provide some efficiencies.

In summary, merging the two departments does not provide many operational efficiency gains.

UW Department of Physics, Astronomy, & Atmospheric Science Academic Expertise

(Limit to 3 pages)

Atmospheric Science Group: Within Atmospheric Science, the core research strength lies within two closely related areas – (1) the development and use of advanced observational instruments and facilities and (2) high-performance computing and modeling all focused on addressing grand challenges in climate, high-impact weather, water availability, and air quality. The Atmospheric Science group is exceptionally endowed with ready access to (a) world-class measurement capabilities (UW King Air and air quality mobile lab facilities) and (b) world-class high-performance computing infrastructure (NWSC). The research of our faculty and graduate students is facilitated by a highly qualified team of engineers, scientists, and technicians, a team that is enabled by the UWKA facility.

Airborne atmospheric research: the UW King Air Research Facility

The Atmospheric Science group has operated aircraft for atmospheric research since the department's inception in the 1960s. The current UW King Air (UWKA) has flown in support of projects funded by the State of Wyoming, the National Science Foundation (NSF), the Bureau of Land Management, the Department of Defense, NASA, NOAA, USGS, and several private companies. The UWKA has been part of the NSF Lower Atmosphere Observing Facility (LAOF) Program since 1988 and as such funded through a series of 5-year cooperative agreements between NSF and UW. The most recent cooperative agreement (CA8) provides $12.5 M of base support over 5 years, through 2024, supporting staff and aircraft/equipment maintenance. The UWKA's remote sensing instruments, the Wyoming Cloud Radar (WCR) and Wyoming Cloud Lidar (WCL), remain an important source of recognition and the basis for internal and external requests for the use of the UWKA.

The current UWKA aircraft will be retired in 2022. UW recently purchased a lightly used King Air 350i aircraft, which will enable a greater payload, longer endurance, and more electrical power (compared to the current aircraft). The development of this replacement aircraft (UWKA-2) is underway, funded through a $15.8M NSF Mid-Scale Research Infrastructure (MSRI) grant that supports the design, modifications, and certifications of the new aircraft. The UWKA-2 will retain the same position in the NSF LAOF fleet and will become operational in 2023.

The UWKA-2 will not only meet the needs of the UW Atmospheric Science group and the NSF-supported community, but will also include new instruments and capabilities that are not currently available to the broader atmospheric science community including new atmospheric chemistry probes, state-of-the-art airborne profiling cloud radars, the next-generation airborne Raman Lidar, and Doppler Lidar. It further will revolutionize ground-to-air communication to facilitate remote instrument access and more effective student participation for education and training.

Air quality mobile research facilities

In recent years the Atmospheric Science group has built its ground-based and airborne air quality and greenhouse gas measurement capabilities. We now are able to measure particulates, ozone, volatile organic compounds, and greenhouse gases thanks to a series of instruments for use onboard the UWKA and in the Mobile Air Quality Lab funded by the School of Energy Research (SER) and external grants. The Mobile Air Quality has been funded by NSF, DOE, NOAA, the Environmental Defense Fund (EDF) and other non-profits, State Departments of Environmental Quality and industry partners. As part of the MSRI grant, new instruments are being acquired for an even broader suite of atmospheric chemistry measurements. We also operate the Wyoming Air Quality Aerosol Measurement Lab (WAQAML) facility, which monitors air quality year-round at several sites in Wyoming through a Cooperative Agreement with the Bureau of Land Management.

These capabilities are relevant for research, education, economic development, and public service needs of Wyoming and the nation. Currently these resources are contributing to multiple industry collaborations to reduce greenhouse gas emissions during natural gas production, and they are being utilized to better understand emissions from wildfires, oil and gas, and agriculture that impact local air quality.

Weather and climate modeling and analysis of large data sets from Earth Observing platforms: the NCAR Wyoming Supercomputer Center

The second core strength within the Atmospheric Science group is high-performance computing and numerical modeling, enabled through UW's privileged access to the NCAR Wyoming Supercomputer Center (NWSC) and support from the Advanced Research Computing Center (ARCC) at UW. Projects funded through these efforts have leveraged the NWSC resource in numerous grants from NSF, NOAA, NASA, and DOE. As part of its 20-year contract with NCAR and the State of Wyoming (2009-2028), UW remains obligated to continue to support the NWSC. This contract entitles Wyoming researchers to 1/7 of the supercomputer's core hours and data storage. The implementation of the third generation 19.87 petaflop Derecho supercomputer in 2022 is projected to more than triple the capabilities of the current machine and will result in continued growth of the UW allocation and resultant capabilities. Faculty and researchers within Atmospheric Science are the top users of the UW allocation. Nearly all faculty have some allocation on NWSC, often coupled with projects that also include observations from either the UWKA or mobile lab facilities. Allocations are also used for classes to allow students to use world-class computational facilities and become familiar with high-performance computing workflows and infrastructure. Specific areas of research focus include understanding and improving predictability of future weather and climate, modeling of atmospheric phenomena spanning global, meso-, and cloud scales, atmospheric chemistry modeling, development of parameterizations from large model datasets and/or satellites, and applying machine learning techniques to interpret observations from Earth Observing (EO) platforms (e.g., UWKA observations or satellite remote sensing) and climate models.

Condensed Matter Group: Faculty research in condensed matter physics focuses on advanced materials and novel phenomena. These foci align well with federal funding priorities and the 2021 United States Innovation and Competition Act (USICA). Below, we outline four categories that reflect the condensed matter group's ongoing and future research directions. Much of our research is interdisciplinary, involving collaborations with faculty/scientists across campus, and is strongly related to emerging fields like quantum information science.

Quantum Materials: Faculty members study nanoscale physics, at which materials exhibit novel quantum states and phenomena and have useful applications in advanced quantum computing (USICA §2005/2211). Examples of the materials that we analyze include: (1) superconductors; (2) Majorana zero-mode states in topological superconductors; (3) quantum Hall, quantum anomalous Hall, and topological insulators; and (4) Mott insulators.

Topological Phases: Topology is a new way to understand condensed matter, which garnered three Nobel prizes in 2016. Certain materials can host topologically driven phases which provide playgrounds to better understand and manipulate topology-related phenomena to develop advanced technologies (USICA §2005). Faculty and students focus on: (1) magnetic skyrmions (topological non-trivial spin textures) for future magnetic data storage; (2) topological superconductivity (topological non-trivial superconducting states) for quantum computing; (3) topological insulators and Weyl semimetals.

Magnetic Materials and Spintronics: Faculty members study the fundamental properties of magnetic materials with a view towards spintronics applications. Developing knowledge of magnetism and ways to control it electronically, and vice versa, is both fundamental, and critical to enable high-speed data processing with low-energy consumption (USICA §2005). Our main directions are: (1) two-dimensional van der Waals (vdW) magnetic materials (atomically thin

magnets); (2) spin-dependent electronic transport; and (3) magnetic moment switching using spin-momentum locking (from a topological insulator).

Energy Materials: Faculty members also have expertise studying and developing materials for energy applications (USICA §2005/2214). For example: (1) photovoltaic materials, including organic photovoltaics, quantum dot sensitized solar cells, and novel metal-organic halide perovskite solar cells; (2) energy storage in magnetic materials like magnetic skyrmions; (3) thermoelectric materials to convert waste heat to electricity; and (4) converting and extracting high value materials from Wyoming coal mines and waste.

Astronomy Group: The astronomy faculty advances many of the highest-ranked goals articulated in the National Academy of Sciences 2010 and 2020 decadal surveys, using facilities and techniques emphasized within the 2021 United States Innovation and Competition Act (USICA). Discipline- specific expertise includes; **galaxies**, **cosmology**, **large surveys**, **instrumentation**, **stars**, **planets around other stars** (exoplanets), **quasars** and **data science**. Faculty and their teams of students harvest large datasets from a variety of space- and ground-based facilities, including UW's *Red Buttes Observatory, the Wyoming Infrared Observatory (WIRO) and the Apache Point Observatory consortium*, as well as next-generation DOE (USICA §2117), NASA and NSF facilities such as the Dark Energy Spectroscopic Instrument, the imminent James Webb Space Telescope (USICA §2634), the Nancy Grace Roman Space Telescope (USICA §2634) and the Vera Rubin Observatory (Astro2020). Their teams harness Wyoming-based, and national, high performance computing (HPC; USICA §2005) facilities to comb these datasets, employing, e.g., machine learning (USICA §2005), artificial intelligence (USICA §4206), and numerical methods. Wyoming students are prepared for careers in STEM disciplines of national need (USICA §2522, including teaching in rural and high-need schools) as they develop the skills required for a technical workforce (USICA §2210, 6112). Faculty-inspired outreach programs like *Science Kitchen, the UW Teton STEM Academy, the UW Windy Ridge Foundation Astrocamp, Launchpad, the interdisciplinary WySLICE program, and the innovative Astronomy REU at WIRO* prepare K-16 scholars for careers in technical fields and better equip K-12 teachers (USICA §2661-64). Established alliances with minority-serving institutions like the California State University CAMPARE program broaden participation in STEM fields in order to utilize the full potential of the national workforce (USICA §6121). Key related efforts include *the Wyoming State Science Fair, the Harry C. Vaughn Planetarium, and the NASA Wyoming Space Grant Consortium* (USICA Part VI, §2664). Abundant access to HPC and telescopes positions UW astronomers and students to lead competitive proposals and forge collaborative research in areas of national concern. Faculty hires in computational areas such as data science, time-domain astronomy and numerical modeling of exoplanetary atmospheres will solidify the new College of Engineering and Physical Sciences as a national leader in these growing subfields. Such hires will elevate the group to a nationally competitive seven faculty, magnify the value of UW, State, and private investment in astrophysical facilities, and bolster the Department's associated education and outreach in a rural region. Since nearly ½ of new Astronomy PhDs are women, faculty hires in this group are a promising strategy to achieve diversity and equity in UW physical sciences.

Unintended Consequences, Mitigation Strategies, and Alternative Approaches

(Limit to 2 pages)

The committee has come up with a long list of unintended consequences and has developed initial mitigation strategies. Developing comprehensive mitigation strategies for these unintended consequences will take more time than this committee had to prepare this report. The committee supports the proposed merger and has no suggested alternative approaches.

Unintended Consequences

Sessions with the faculty in both departments yielded many concerns about unintended consequences. These concerns have been sorted into five categories: Operational Issues, Student Issues, Faculty Issues, Impact on Existing Structures, and Logistics. ***A full list of these concerns is in Appendix B.***

Operational Issues

Several of the concerns center around migrating operations from the College of Arts and Science into the College of Engineering and Applied Sciences. The business models in the two colleges are very different and there is concern that operations will be disrupted in the move. Examples include GTA support, technical staff support, and overhead return, and staff operations among many other issues.

Other concerns about operational issues are developing new faculty bylaws and maintaining department visibility.

Finally, there is deep concern that the 2-13 process has been rushed and could possibly lead to bad decisions with long-lasting consequences.

Student Issues

There were a few concerns about curricular issues including P and A undergraduates no longer needing to take the Arts and Science Diversity and Global core courses, recruiting and branding issues, and accreditation issues.

Faculty Issues

There were concerns about unintended consequences revolving around faculty issues. These mostly centered on department cultures and expectations. Examples include concerns about teaching load and research expectations, determining CPM priorities (if CPM continues), differing AP cultures and pay scales, and handling of RTP.

Impact on Existing Structures

Perhaps the longest list of concerns and the deepest concerns were about the impact of the merger on existing structures in place in both departments. The Atmospheric Science

department is concerned about disruptions to its King Air Research Facility and their passenger flight operations. The Physics and Astronomy department is concerned about disruption to their WIRO facilities, their TA staffing of lab courses, the Governor's Science Initiative, and their STEM outreach activities.

Logistics

Finally, there were concerns about logistics such as physically relocating faculty and staff, operating in two different buildings, and meeting space.

Mitigation Strategies

A summary of mitigation strategies for unexpected consequences categories is presented here.

Operational Issues

- Concerns about this expedited 2-13 report process can be mitigated by allowing time for further discussion and implementations regarding once the merger is approved, if it is indeed approved.
- Concerns about migrating operations from the College of Arts and Science in the College of Engineering will need to be addressed at the college level. This has already begun with discussions between the CEAS business office and appropriate business offices in Arts and Science.
- Mitigating reduction in visibility can be addressed by careful marketing (print, web presence, social media) emphasizing units (the current departments) rather than the new merged department.

Faculty Issues

- Most concerns with faculty issues can be addressed with carefully developed department bylaws. It would be beneficial to have these bylaws established before the merger becomes official. The window to develop these bylaws would be between the BOT vote in November 2021 and the implementation of the merger in July 2022.
- Concerns about the RTP process can be addressed by carefully crafted guidance documents with respect to tenure and promotion.
- Concerns about department unity and department culture can be addressed with regular gatherings, both work and social.

Impact on Existing Structures

The committee did not develop mitigation strategies for impact on existing structures (e.g. the King Air Research Facility, the Wyoming Infrared Observatory, the Planetarium, the structures in place for Physics Labs), but it seems reasonable that before any changes are made that open discussions be carried out by all stakeholders. This is already taking place.

Appendix A. Benefits

Below is a complete list of the benefits of the proposed merger. Not all fit in the page limit in the main report.

Research Benefits

- The combined department will have a strong link to the new School of Computing (SoC), and is likely to grow as the SoC advances, as there is a high probability that some of the inaugural SoC faculty will be housed in the new joint department.
- P&A consists of two separate research units in a single department (Astronomy and Condensed Matter Physics) and the addition of a third unit should be relatively straight-forward.
- ATSC currently has no undergraduate program at UW, and because of this current recruitment of graduate students is almost entirely external (non-UW). With the merger there will be a natural pipeline for good UW undergraduate physics students to enter the ATSC graduate program.

Educational Program Benefits

- CEAS supports BS/MS "Quick Start" programs. There is a potential for students to enter all permutations of Physics, Astronomy, and Atmospheric Science BS/MS Quick Start programs (Physics BS/Physics MS, Physics BS/Astronomy MS, Physics BS/Atmospheric Science MS, etc.)
- There could be synergy between the two departments teaching courses in each other's units.
- The B.S. in Astronomy & Astrophysics is essentially the physics B.S. plus 4 astronomy courses. With relatively little new faculty support, it would be possible in the future to create a similar B.S. in Atmospheric Physics.
- More immediately, an undergraduate minor in Atmospheric Sciences could be developed.
- Some elective courses are similar or are duplicated at the master's level between the two departments. Electives could therefore be merged, or taught within the department.
- Physics faculty could teach classical mechanics (Engineering Science) courses in CEAS.
- If needed, ATSC graduate students with strong Physics backgrounds could possibly help TA Physics courses.
- We may dual-list (4000+5000) some graduate courses (Physical Meteorology I, Objective Analysis, Radiative Transfer …), as part of the QuickStart program, thereby increasing enrollment in those classes.
- P&A faculty could teach courses that would benefit ATSC graduate students, adding expertise that currently does not exist in in ATSC.

Other Benefits

- The department cultures are similar: both departments are research-active and able to recruit strong graduate students.
- The merger would create a larger pool of specialized staff resources. Both departments conduct instrument-heavy externally funded research, requiring skilled technical and engineering personnel support (e.g. UWKA and WIRO). The merger of the two departments

may make it easier to maintain certain technical skills and equipment and build a shared pool of technical capabilities. For instance, P&A has 1 Ubertech.

- The merger would bring the ATSC unit closer to the NASA-EPSCoR Space Grant Consortium, which is housed in Physics. Much esearch in ATSC is conducted with NASA instruments (e.g. remote sensing instruments, aircraft facilities), NASA models (MERRA reanalysis and GISS climate model), NASA research grants, and NASA colleagues.
- There is the possibility of ATSC collaborating with P&A in their STEM summer camps funded by an NSF REU site grant and/or private donors (https://www.uwyo.edu/physics/summer-science-camps.html). For example, it may be possible to have a summer camp combining astronomy and atmospheric science, maybe incorporating both observations and modelling.

Appendix B. Unintended Consequences

Sessions with the faculty in both departments yielded many concerns about unintended consequences. These are listed here without much editing to preserve the nature of the concerns. These concerns have been sorted into five categories:

- Operational Issues
- Curricular Issues
- Faculty Issues
- Impact on Existing Structures
- Logistics

Below is the complete list of the unintended consequences of the proposed merger.

Operational Issues

- Observatory staff/budget in P&A. Could this be diluted now that astronomy is a third of the new department instead of half?
- Some of the P&A GTA support comes from A&S. Will this A&S budget for GTAs be ported over to the new College of Engineering and Applied Science (CEAS)? Many of the large service courses in P&A would be infeasible to teach without GTA support. So, without GTA support at the current level, the department would need new faculty or teaching loads would have to increase.
- Different funding modes for operations between A and S and CEAS.
- Operational Budget impacts
- Handling of overhead return
- Impact on staff
- The rushed process could possibly lead to bad decisions.
- The merger may affect individual units' visibility, particularly with the renaming of the department.
- Still, it will be difficult for the merged department to be as coherent as the individual departments currently are. As mentioned under Q1, the merged department will consist of three applied physics disciplines, two of which (Condensed Matter and Astronomy) have a long history of working together under one roof, and one group (ATSC) is new. Working out bylaws to manage new faculty hires, RTP, and so on will assist in making this transition smoother.
- There are concerns about our ability to effectively merge staff support, including accounting, payroll, HR management, GA management, flight scheduling, etc.

Student Issues

- P&A undergrads will presumably no longer need to take the A&S Diversity & Global core courses. Will this require a short-term change to the degree plan(s)? Does it leave a two-course gap in the major that needs to be filled?
- Recruiting and branding issues
- Accreditation issues

Faculty Issues

- Teaching load/research expectations documents should be examined to see how much agreement there is between departments now. Tenure expectations and job description documents will need to be merged.
- Determining CPM priorities
- Differing AP (extended track and rolling contracts) cultures and pay scales
- Handling T and P
- Teaching loads between units
- Cultural differences

Impact on Existing Structures

- Weakening of the Governor's Science Initiative goals, which were intended to bolster core science departments. Will the merger affect these goals (e.g. will the creation of a Center for Advanced Scientific Imaging be negatively impacted)?
- This could impact ATSC's newly developed strategic plan.
- The ATSC King Air program operates closer to a business enterprise than an academic enterprise in many ways. This may be difficult to maintain in the merger.
- This may affect NCAR supercomputer usage.
- There are complicated time-management issues with non-King Air projects that would need to be navigated.
- This might impact the ATSC passenger King Air (separate from the research King Air aircraft) management.
- The department of ATSC operates an atmospheric research aircraft, the UWKA, plus a series of instruments, through a Cooperative Agreement with NSF. This 5-year agreement, currently the 8th one (CA8), with a gross budget of ~2.5M per year, employs a team of ~15 research scientists and engineering, technical, and aviation support personnel, all in support of the UWKA National Facility, which is part of a broader network of platforms and instruments that can be requested by the NSF funded community to conduct atmospheric research. There is a symbiotic relationship between the department and the UWKA Facility: On the one hand, ATSC faculty work closely with facility scientists and engineers to pursue their own research and thereby build the capabilities of the UWKA facility, keeping its capabilities state of the art. For instance, UW faculty acquired a 5 year, $15.8M MSRI grant to build the next generation UWKA and a series of novel instruments. In short, the UWKA Facility depends on ATSC faculty. Expertise housed in the UWKA facility (research scientists, technicians, engineers) and a business manager to support them benefits the faculty. Stable support for people in the facility is critical. In addition to maintaining an expertise pool that benefits the academic side of ATSC, the UWKA facility assists the department monetarily. Base funding and field deployments generate funds, mainly indirect cost but also non-NSF cost-recovery deployment income, funds that are used to support department-wide activities. For instance, these funds largely support our business manager, occasionally support or supplement support for graduate students, and at times provide funding for the purchase of major equipment that can help the research enterprise of the department. In the merger positive feedback should be maintained between the UWKA facility and academic research.
- Effective recruitment of top-quality graduate students is important to ATSC. UW ATSC has name recognition built over many years of outreach and recruitment efforts. Merging may lead to less visibility and a drop in quality and number of external graduate applicants targeted to our program.

Ensuring that we maintain our visibility on the internet as a separate discipline in a larger department will mitigate this.

- ATSC has a special relationship with UW Operations for UW aerial passenger service, using the N200UW aircraft. This partially supports the UW Flight Center, in particular pilots and aircraft mechanics. Flight services for the operation of the passenger aircraft and the research aircraft (UWKA) benefit from an economy of scale, significantly reducing the cost of either operation. There was an ill-fated effort in 2016-18 to separate these two operations. It is important that this special relationship between ATSC and UW Operations is maintained.
- Impact on outreach activities

Logistics

- Where will the new department be physically situated? Many P&A faculty have equipment and large labs. Will the faculty all move to one building? Which building? A new, custom facility? Or, will the new department be split across two buildings?
- If units are in different buildings, there are logistical hurdles (support staff location, printers, etc.)
- Space for in-person meetings