

The King Air Advisory Panel met on April 22, 2020. The agenda included a status update on current aircraft operations, ongoing upgrades, and COVID-19 impacts, followed by an update on the three phases of the MSRI. The individual presentations are available at <https://drive.google.com/drive/folders/1KAFjlxCJOkQ3MEFkLWww5qpl7NZWZGWx>.

Overall, the perception of the panel is that progress towards transitioning to a new aircraft is going well despite the impacts of C-19 delays. Progress on the significant ongoing upgrades, and the completion percentages, are provided below:

- 1) Spec Inc HVPS (50%)
- 2) new DMT SP2, whose aerosol size distributions will replace the current UHSAS (15%)
- 3) DMT LWC 301 (15%)
- 4) replacement static pressure system (50%)
- 5) scientists display systems (80%)
- 6) replacement inverter system (95%)
- 7) replacement time server (100%)
- 8) new Applanix IMU system (100%).

These have all been purchased. Development of a more user-friendly website with more information content is on-going. The current plan is for test flights in 10/2020 of the upgrades; if COVID-19 concerns extend to October, the test flights might need to be delayed.

COVID-19 is imposing delays upon upcoming field campaigns to which the current plane is committed. The delays will require a complex rearrangement of field deployment schedules, not all of which can be known at this time. In particular, several field studies currently under review (APART-21, ESCAPE-21, RADFIRE2) have proposed time schedules that will conflict with known delays (SWEX-20, possibly SPICULE-20). Delays will also impact the expected PROMO and WINTRE-MIX requests. There is no flexibility in the transition to the new aircraft. The new aircraft has a delivery date of mid-April 2022, with target operations beginning in mid-2023. UW will support projects through April 2022 with the current plane, with no promise to do so thereafter.

The acquisition of the new airplane is progressing according to schedule, with the U of Wyoming commitment from its Board of Trustees in place. The review of candidate aircraft (a choice of approximately 5) from Avcon will begin in May, 2020, with a purchase agreement for one of the choices provided by late May/June. Phase 2 and 3 of the MSRI concern the modifications and certification of the new plane, which the Board of Trustees approved in April. The certification plan for wing tip hardpoints, nose extension, and two additional zenith ports will be developed by September. A requirement is that these not impact the Reduced Vertical Separation Minimum (RVSM), a certification for the static pressure and autopilot that will allow the new aircraft to fly above 28 kft within the US (the current King Air is not RVSM-certified). An existing nose radome will be reused to avoid needing a certification of a new radome. The requirements for the new certifications are a potential concern, primarily because of the uncertainty involved. A 3yr contract for the modifications is in place with Avcon, and is \$0.4M under budget. This will allow for some flexibility, should it become necessary.

The current plan is for the new PT6A-67 engine to be installed by 12/2020, with all the modifications applied to the new plane by early fall of 2021, so that the RVSM verification flight can occur on 12/2021, with all of the post-modification test flights done in time for a approval by FAA by 2/2022. Under this timeline, Avcon will deliver the new plane to UW by 4/2022.

The creation of the new versions of the Ka-band Precipitation Radar (KPR2) and Wyoming Cloud Radar (WCR4) are on time and on budget, with more details available in its presentation. These should be completed in time for the test flights in early 2021. Work on the MARLI-2 Lidar and Airborne Doppler Lidar (ADL) is also on target. The latter is occurring on a more relaxed timeline as the work need not be completed until the modifications to the new plane are finished.

Vendor selection for the trace gas and aerosol instrumentation is ongoing, following a priority order of 1) an NO_x instrument; 2) well-characterized aerosol inlet; and 3) trace gas methane and CO instrumentation, most likely from a company named Aeris; 4) a research scientist hire; and 5) ozone instrumentation. Instrument capabilities are rapidly evolving. A recommendation was made by the KAAP to pursue a NOAA-developed NO_x instrument built through an NCAR/Wyoming partnership, with some commercial instruments deemed expensive and less capable. A new hire at NCAR is in a position to lead the development. Although there is interest in pursuing an CVI inlet capability as well, this is a lower priority that will depend on budget availability. Overall the work appears to be progressing well.

The last discussion focused on ongoing work to develop an immersive environment for science and education. A user needs survey is being developed. The design for the antenna that will provide the domestic connectivity necessary to support the remote interaction is being finalized. This part of the project also appears to be progressing well.

In summary:

The MSRI appears to be going well, with COVID-19 providing challenges to the timeline that are not yet fully realized. The certification process is still to be navigated fully and is potentially stressful, although the relationship between UW and Avcon seems functional. KAAP also recommends meeting with the local FAA Aircraft Certification Office together with AVCON at some of the milestones, so that any issues with the FAA certification schedules can be identified early.

KAAP committee:

Paquita Zuidema - Chair, Professor of atmospheric sciences at U of Miami.

Jeff Stith - NCAR Senior Scientist Emeritus, Research Aviation Facility former manager

Teresa Campos - NCAR Project Scientist, aerosol and trace gas scientist

Beat Schmid - DOE ARM Aerial Facility manager

Paul Shepson - Dean, School of Marine and Atmospheric Sciences, Stony Brook U., NY