PAC COMMENTS ON ATF ROADMAP
ATF SCIENCE PLANNING WORKSHOP 2024

SANDRA BIEDRON

ELEMENT AERO

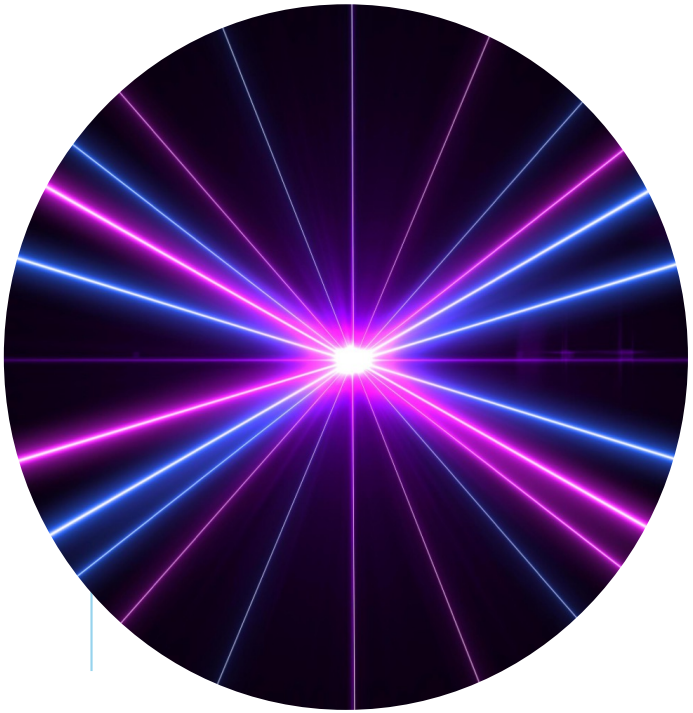
SCHOOL OF ENGINEERING

ATF PROGRAM ADVISORY COMMITTEE (PAC)

The Accelerator Test Facility (ATF) Program Advisory Committee (APAC) is responsible for evaluating research proposals from ATF users and the scientific utilization of the ATF. It also provides advice and feedback on the developments and upgrades required to achieve and maintain the highest possible scientific and technological productivity at the facility. In keeping with this mandate, APAC will provide advice on the following topics:

- User Experiment proposals approval based on scientific and/or technical merit, as appropriate.
- Progress and performance of ongoing user experiments.
- Scientific output and utilization of ATF as a DOE Office of Science User Facility.
- Planning, development, and operation of ATF to meet long-term scientific and technology objects of the DOE Accelerator Stewardship mission.
- Policies and procedures relevant to user access and utilization of ATF.

PAC MEMBERS



SANDRA BIEDRON (CHAIR)

UNIVERSITY OF NEW MEXICO AND ELEMENT AERO

FELICIE ALBERT

LAWRENCE LIVERMORE NATIONAL LAB

MANUEL HEGELICH

TAU SYSTEMS

JOHN POWER

ARGONNE NATIONAL LAB

CRAIG SIDERS

LAWRENCE LIVERMORE NATIONAL LAB

EVGENYA SIMAKOV

LOS ALAMOS NATIONAL LAB

RONALD WILLIAMS,

FAMU

A FEW THOUGHTS

THE PLANNING PROCESS

- The ATF Science Planning Workshops might be broadened in scope to include Science, Technology, and Engineering.
- The Workshop might need to be held at a higher frequency to assist the facility, the host institution (Brookhaven), partners, and sponsors in planning.
- Consider adding a half day for breakout/think-tank sessions at the tail end of the workshop (after presentations) on several far-reaching topics and feel this input into the Workshop report. With the presentations, facility tours, and discussions fresh in our minds, it is the best time to generate and capture additional ideas and solutions.

PARTNERS

- What does a future ATF partner look like and what are the parameters of such a relationship (”buy-in” through monetary or equipment or staffing?, ratio of partner time to general user time. Etc.)
- Perhaps a few scenarios of engagement could be discussed in a subgroup and a summary could be shared with the attendees before inputting into the workshop report. Explore additional public-private partnership scenarios.
- In the calls for proposals, perhaps different kinds of users (e.g. regular users and proprietary users) and other scenarios could be expanded.

PARTNERS, CONT.

- With academic partners, consider NSF infrastructure grants that would be hosted at BNL. Look at the MagLab model with a portion of the research infrastructure based at LANL.
- There are partners outside of academia and other national laboratories. Think of ways to engage.
- Encourage more joint proposals with industry and other government agencies/entities. These entities or ATF could lead, depending upon scope.
- NNSA needs trained folks who can "speak" to knowledge languages spoken at the ATF (e.g. lasers, electrons, ions, electromagnetics). Seek to partner with NNSA.
- Global security means more than DOD, NNSA, five-eyes, NATO, DHS, etc. Contributions to sectors such as medicine, energy, and semiconductors (including microelectronics testing) also play into global security.

THE RECENT BRN

- The recent BRN *and the cousin reports/workshops* are important to the ATF roadmap and should be echoed in this ATF workshop summary. (See the laser technology BRN and the talk from Geddes
  - Types of lasers MIR (2-10 microns) Type I, II, and III lasers
  - PRD 2: Transform the Mid_IR Sources for Science from THz to X-Rays
    - Increasing repetition rates
    - Pulse compression
    - Waveform-controlled sources mid-IR to THz
  - PRD 3: Revolutionize Frequency Conversion and Field Control
  - PRD 4: Reinvent materials and optics for intense laser science
  - Then the cross-cutting areas – workforce, competition, etc.
  - Slides 22, 23, and 24 from Geddes talk

A FEW CONCERNS

- How to avoid BeamNetUS being distracting from the main ATF roadmap, goals, etc. In other words, place the pieces together.
- Is the ATF steering away from accelerators and heading to lasers? Funded by ARDAP but is a mostly laser facility now?
- Change name to show evolution over the last 30 years and into the future? Advanced Beam Test Facility; Advanced Beam and Technology Test Facility
- Impedance mismatch between funding and community/facility needs. More funding needed to really make a strategic leap ahead for the most advanced suite of source facility!

A FEW THOUGHTS ON STEPS TO TAKE INTO CONSIDERATION

- At the start of each event, have everyone introduce themselves and tell affiliation to the ATF
- Consider each and every imaginable timing scheme - pre-pulse, pre-ionization, pump probe etc. Consider even future end-user (e.g. materials) proof of principle/ring the bell experiments USING the source. Architect these into the upgrades now.
- Better beam stability to bring it up to the level of other electron accelerator facilities
- Restore operation of the x-band deflecting cavity to have something unique. Might be needed on multiple beamlines of now and of future. Maybe even a couple locations on a beamline (depending on experiments).
- EO sampling for various points through the beamlines
- New LWFA beamline as well as experimental chambers
- Consider 24-7 operations to keep the systems running or in simmer.
- Shorter CO2 pulses, higher rep rate CO2, and of course higher peak powers etc.
- Another one or two CO2 lasers!
- Have a TW (or future PW) class NIR laser or two on hand that is reprateable
- Think of ways to have a tunable 9 to 2 micron high peak power “laser” or lasers on hand for another source for material and other testing.
- Highest energy linac possible.
- A second (or third) linac with more beamlines!
- ATF should have a clear presence in the discovery center at Brookhaven.

GREAT WORK

- We have seen first-hand of the impact of the direction and resource allocations that the 2019 workshop guided. Many things that were guided have come to fruition.
- The ATF is an absolutely one-of-a-kind, world-class innovation space for beam science, technology and engineering (STE). The clear increase in the number of diverse staff members and users is quite notable and is applauded. Also, we applaud the ATF team's great effort in building the workforce for the community. We want to stress that additional resources to improve the facility even further would be welcomed by the existing ATF user community and the greater community, as is clearly reflected in the recent BRN on Laser Technologies.
- Let's plan for the next successful 30 years!