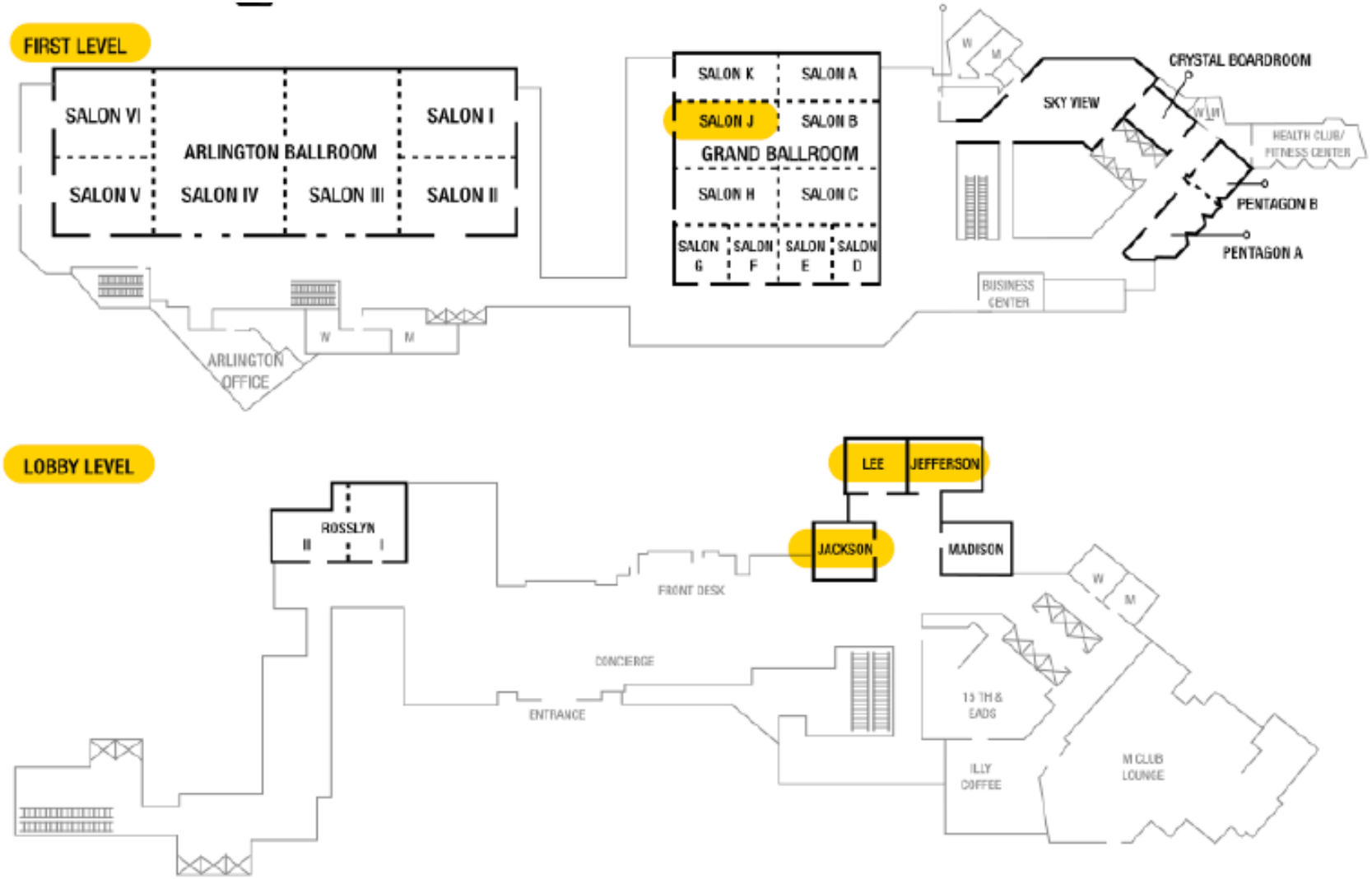
BREAKOUT SESSION

Breakout sessions – Morning and Afternoon
Jackson, Lee, and Jefferson Rooms – Lobby Level



Morning breakout session

Jackson, Lee, Jefferson Rooms

Proposed discussion topics:

- Participant introductions
- Seed questions:
  1. How pertinent is the chosen application and our proposed metrics? ARPA-E hard goals?
  2. AC or DC power?
  3. What type of motor: permanent magnet, induction, superconducting, etc.?
  4. Choice of developing integrated system vs motor only?
  5. End of project prototype power scale? 10 kW, 100 kW, ….., 1 MW?
  6. Should the voltage be specified?
  7. Thoughts on cruise requirements vs take-off (3x requirements from cruise)?
  8. Safety, reliability, durability? What's needed for aviation?
  9. Other aspects?
- 15 - 20 minutes before the end of the session: each participant to give a 30 seconds to 1 minute summary

Afternoon breakout session – 1/3

Motor centric (Jackson Room) Grigorii Soloveichik, Zia

Proposed discussion topics:

- Participant introductions
- Seed questions:
  1. What are the key technological paths to very high specific power? Risk and barriers, high-risk/high reward paths?
  2. What are the physical limitations that will prevent achieving high specific power (saturation, etc.)?
  3. Gearbox or gearless options?
  4. How important is the co-design of electromagnetics, power electronics, thermal management?
  5. Should a potential program specify the input voltage (motor specifications)?
  6. What should be the cost metric for a n^{th} of a kind? How do you normalize it (e.g. $/kW, other)?
  7. What should be the program needs for the design, conception and demonstration of new electric motor? (duration, logistics, resources, etc.)
  8. Other aspects?
- 15 - 20 minutes before the end of the session: each participant to give a 30 seconds to 1 minute summary

Afternoon breakout session – 2/3

Integration centric (Jefferson Room) Chris Atkinson, Dipankar

Proposed discussion topics:

- Participant introductions
- Seed questions:
  1. What are the key technological paths to very high specific power? Risk and barriers, high-risk/high reward paths?
  2. Should both volumetric and gravimetric power density be specified?
  3. Final demonstration testing at relevant operating conditions? Options to consider?
  4. Are there other metrics a potential program should consider?
  5. Comments on **electric motors improvements** vs **power electronics improvements**?
  6. How important is the co-design of electromagnetics, power electronics, thermal management?
  7. Should the voltage be specified?
  8. What should be the cost metric for a n^{th} of a kind? How do you normalize it (e.g. $/kW, other)?
  9. What should be the program needs for the design, conception and demonstration of integrated system? (duration, logistics, resources, etc.)
- 15 - 20 minutes before the end of the session: each participant to give a 30 seconds to 1 minute summary

Afternoon breakout session – 3/3

Thermal management centric (Lee Room) Dave Tew, Vivien

Proposed discussion topics:

- Participant introductions
- Seed questions:
  1. Role of thermal management to enable very high specific power? Risk and barriers, high-risk/high reward paths?
  2. What should be the cooling approach? Single phase, two-phase?
  3. How about the use of supercritical fluids?
  4. Specific metrics to judge the merit of the thermal management system? Coefficient of Performance, Thermal Resistance, others?
  5. Can/how the progress in microelectronic cooling be transferred to electric motor?
  6. What should be the program needs for the design, conception and demonstration of new electric motor? (duration, logistics, resources, etc.)
  7. Other aspects?
- 15 - 20 minutes before the end of the session: each participant to give a 30 seconds to 1 minute summary

Recall: NOT of Interest

- This potential program is about integration, not the development of new power electronics alone
- Software development alone
- Paper studies
- Material development alone without integration into targeted system or sub-system