Planned upgrades for the ARM HSRLs, and Raman Lidar engineering update

Presented by

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Update on ARM Raman Lidars and Mentors

Mentorship:
• April 2019 - changes in mentorship roles:
  John Goldsmith > associate mentor (20+ years as engineering mentor!)
  Ray Bambha > lead mentor (HSRL) engineering mentor (RL)

Raman Lidars:
• Present - normal operations at all sites
  Oliktok Raman Lidar restored for Summer 2019, resumed data collection June 7
• After MOSAiC - (tentative) Oliktok Raman Lidar may move to Utqiaġvik (Barrow)
Planned upgrades for the ARM NSA HSRL

Current NSA HSRL:
Transmit 532 nm (only), narrow field of view (45 microrad.), fixed orientation

Upgrades

• **Improvements to the maintainability and robustness**
  • Update instrument operating system and software
  • Replace discrete photon-counting and clock PCI boards (4X) with single 16-channel board (custom)
  • Enhanced alignment methods and interlocks

• **Performance upgrades**
  • Increase cross-polarization signal (6X) and alignment stability
  • Reduce range dependence of calibration using fiber-based beam homogenizer
  • Increase calibration signal and frequency using direct injection of seed laser
  • Improve calibration stability by adding etalon isolation valve

• **New capability**
  • Improve accuracy of low altitude (<4Km) extinction cross-section using 532 nm wide-FOV molecular channel, and (tentative) wide-FOV combined molecular+aerosol channel.
  • Obtain wavelength-dependent information for backscatter by adding 1064 nm narrow-FOV channels
  • (tentative) Obtain particle orientation information by adding elevation scanning near zenith
Timeline of activities for HSRLs

NSA HSRL upgrade:
• Nov 2018, Feb 2019  Design reviews for upgrades
• Current           Normal operations at NSA
• mid-July 2019     HSRL offline, shipping to Madison, WI for upgrades
• Late summer 2019  Shelter modifications at NSA
• Late-Jan 2020     Upgrades complete, ship to SGP for testing/operation
• Summer 2020       HSRL returns to NSA (Utqiaġvik)

AMF2 HSRL deployment:
• February 2019 - maintenance/mechanical upgrades at U. Wisconsin in preparation for MOSAiC
• Present -         Shipping to Norway for MOSAiC

NSA HSRL upgrade will provide new retrieval opportunities. For more details visit our poster on Tuesday…