Measurements of NO, NO_y, O_3 on the C130 for WINTER

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$NO\text{-}NO_y\text{-}O_3$

Two instruments integrated with one another:

- 2-channel chemiluminescence instrument for $NO\text{-}NO_y$
- 1-channel chemiluminescence instrument for O_3
- Occupy 1-1/2 GV racks.

Shared:

- Power distribution and power supplies
- Data acquisition system for control and recording
- Pump
- Inlet
- Zero Air
- Operator

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$NO\text{-}NO_y\text{-}O_3$

The technique:

- Both instruments based on the chemiluminescence detection, employing the reaction of NO with O_3 to form excited NO_2.
- This NO_2 detected via photon counting using a dry-ice cooled PMT.
- To measure O3, reagent NO from a gas bottle is added to the sample flow of ambient air to produce the reaction.
- To measure NO, reagent O3 (from an) is added to the sample flow of ambient air to produce the reaction.
- To measure NO_y, the NO_y species are first converted to NO catalytically on a gold surface, and then detected as NO.

NO-NO_y-O_3

Nominal specifications:

- O_3: Precision (1-s) of < 0.1 ppbv at low mixing ratios; overall uncertainty of 5%.
- NO: Precision (1-s) of ~10 pptv at low mixing ratios; overall uncertainty of 10% at high.
- NO_y: Precision (1-s) of ~10 pptv at low mixing ratios; overall uncertainty of 20% at high.
- Data archived at 1 sec.

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Current status:

- Are converting from $NO\text{-}NO_2$ configuration to $NO\text{-}NO_y$
  - Swap converters, NO_y vs. NO_2
  - Inlet pylon on belly, centerline, houses NO_y converter
  - Cal valves, etc., under floor

- Still significant work to do.

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