Targeted Measurements and Instrument Miniaturization

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Targeted Measurements

- **Targeted Measurement:**
  - Single species or parameter (e.g. H$_2$O or CH$_4$ or wind)
  - Optimized for observation objectives (e.g. high spectral resolution or high throughput or imaging)
  - Optimized for platform (e.g. Mass/volume or nadir/limb)

- **Targeted Missions:**
  - Limited number of instruments → reduced complexity

- **Instrument Miniaturization:**
  - Allows access to multiple platforms
  - Allows building multiple copies of the same instrument
Examples:

- Bulk optics SHS
  20 kg, 300 x 600 mm
  (Imaging & throughput)

- Waveguide MZI array SHS
  1 kg, 100 x 200 mm
  (Miniaturized)

Both instruments designed to observe H\textsubscript{2}O at 1364.5 nm
Examples: SWIFT-DASH

Designed to observe Stratospheric wind

Ozone target: 1133.4335 cm⁻¹
(8822.75 nm, 0.23 nm resolution,
6 nm min. spectral range)

High throughput and
Vertical limb imaging

No moving parts

Large instrument: 80 kg, 1 m³
Balloon Platform

- **Science:**
  - Instrument test and flight heritage
  - Develop new applications (Arctic CH$_4$, Phemos, nadir methane imager for Mars)
- **Collaborations:** Industry, University, Government
- **Schedule:** All instruments under active development
- **Requirements:** 30+ km, < 100 kg payload
- **Students:** Currently 2 M.Sc.

- Instruments could be deployed on aircraft, nanosats, rockets or balloons