

Suborbital Workshop

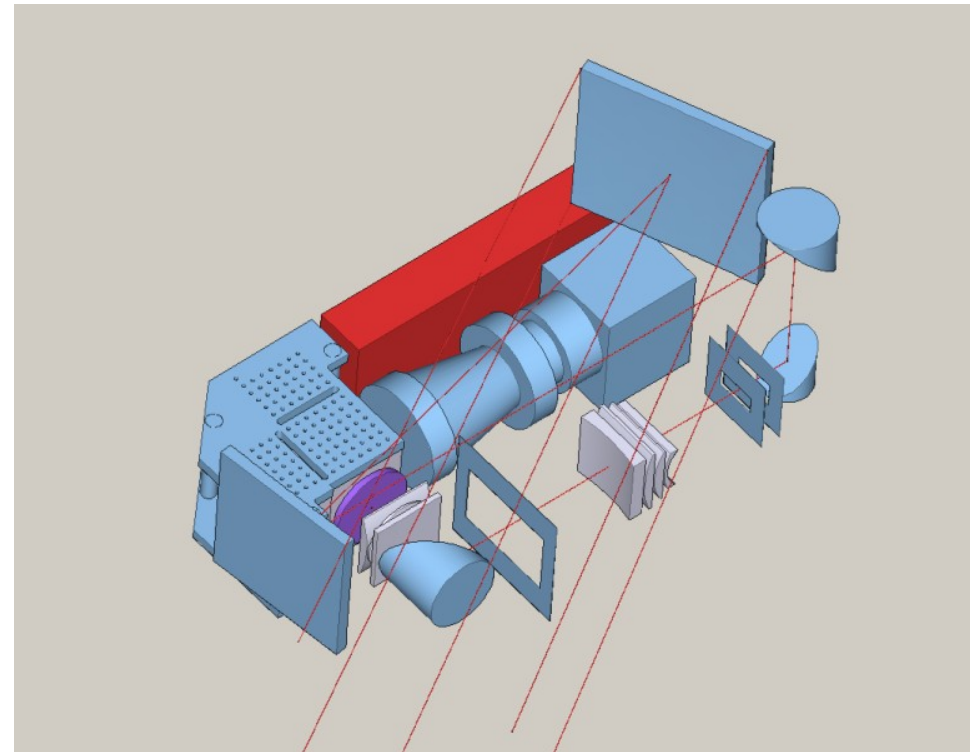
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Targeted Measurements and Instrument Miniaturization

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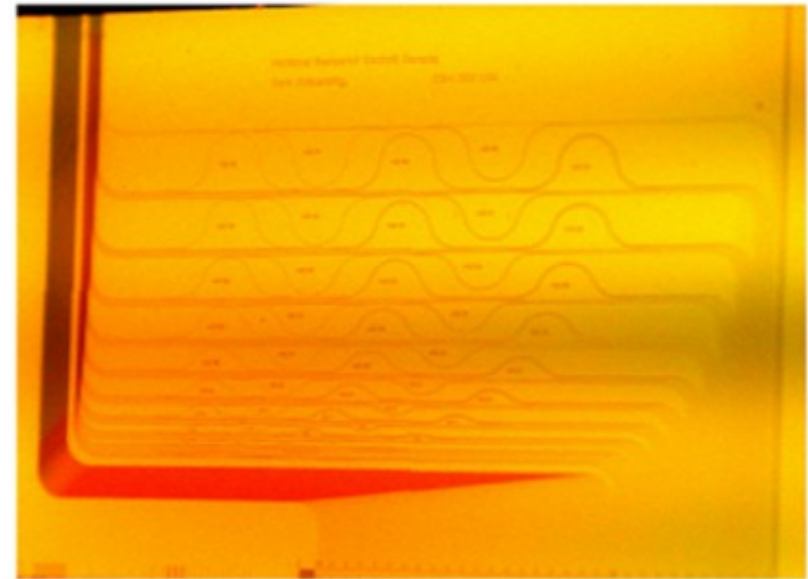
Targeted Measurements

- Targeted Measurement:
 - Single species or parameter (eg. H₂O or CH₄ or wind)
 - Optimized for observation objectives (eg. high spectral resolution or high throughput or imaging)
 - Optimized for platform (eg. 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: SHOW



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 H₂O at 1364.5 nm

Examples: SWIFT-DASH

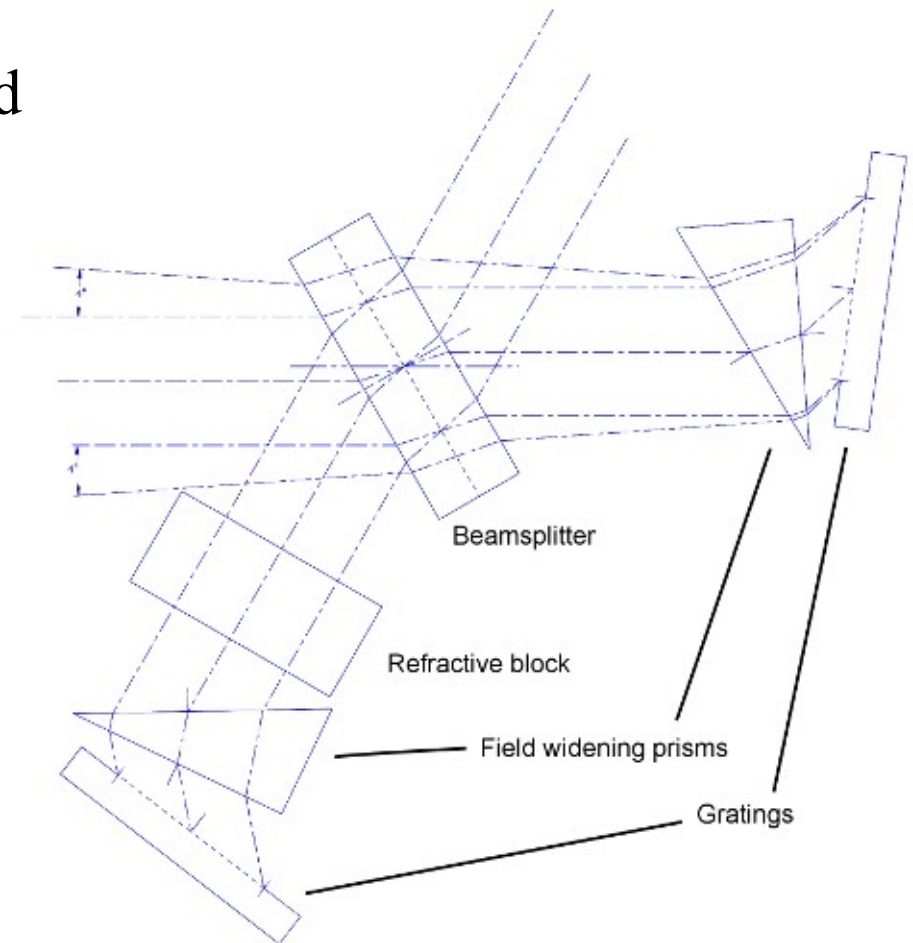
Designed to observe Stratospheric wind

Ozone target: $1133.4335 \text{ cm}^{-1}$
(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 m^3



Balloon Platform

- Science:
 - Instrument test and flight heritage
 - Develop new applications (Arctic CH₄, 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