

**Laser Long-path Absorption Experiment Using
Retroreflector in Space (RIS) on ADEOS**

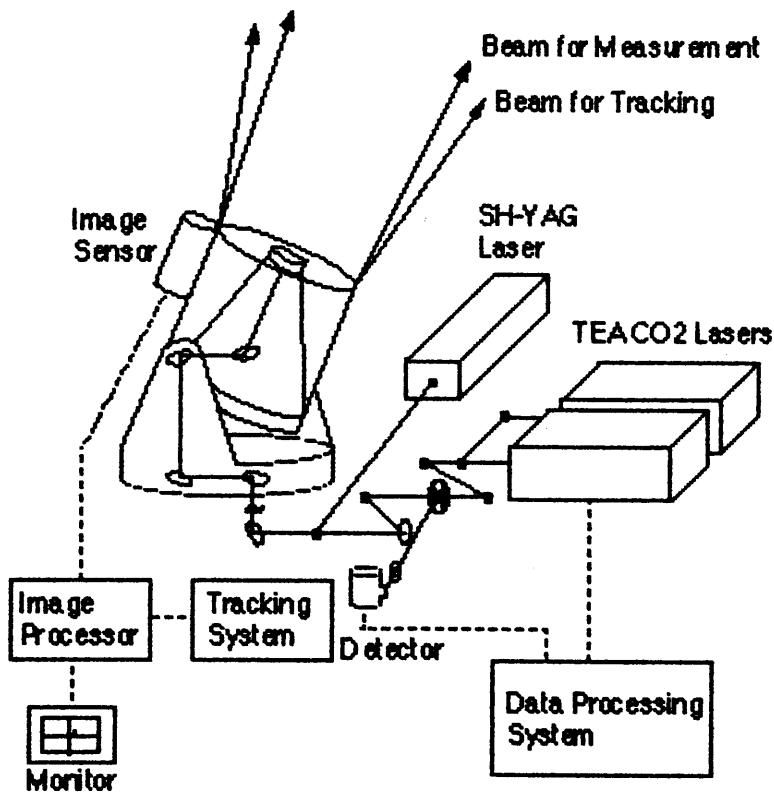
N. Sugimoto

(National Institute for Environmental Studies)

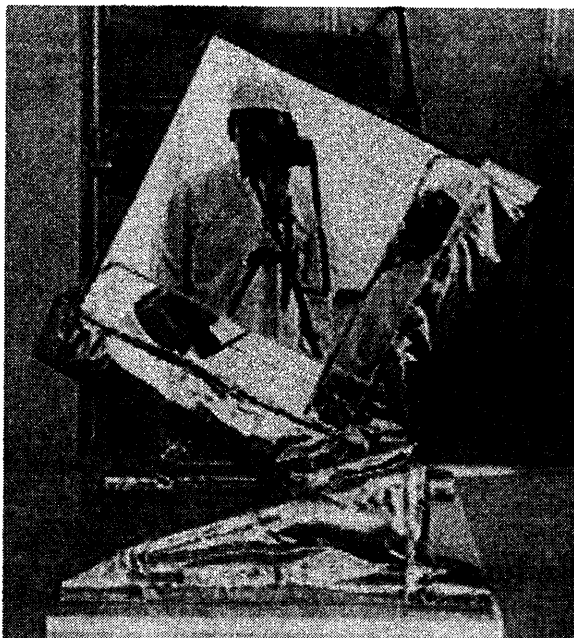
Laser Long-path Absorption Experiment Using Retroreflector in Space (RIS) on ADEOS

Nobuo Sugimoto

National Institute for Environmental Studies

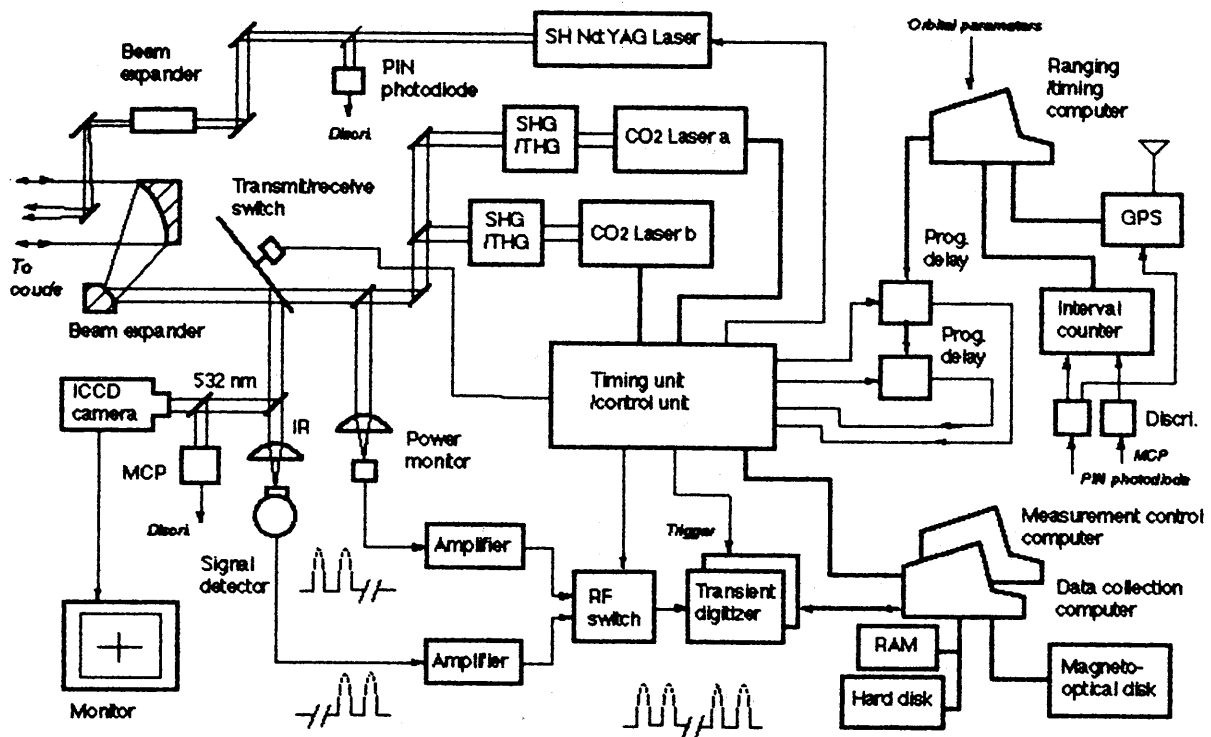


Concept of the
RIS experiment

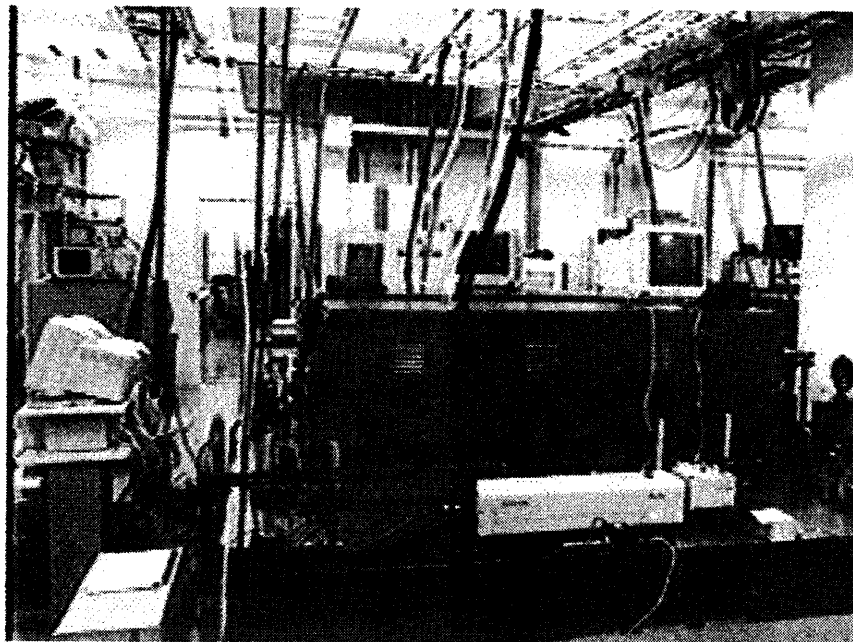


RIS Flight Unit

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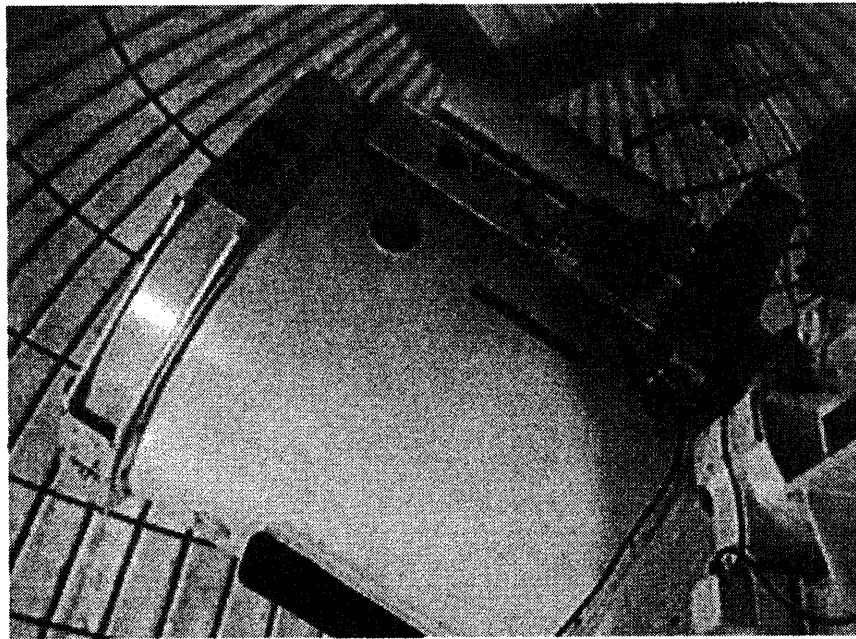


Block diagram of laser transmitter/receiver system



Single-longitudinal-mode frequency agile TEA CO₂ laser system

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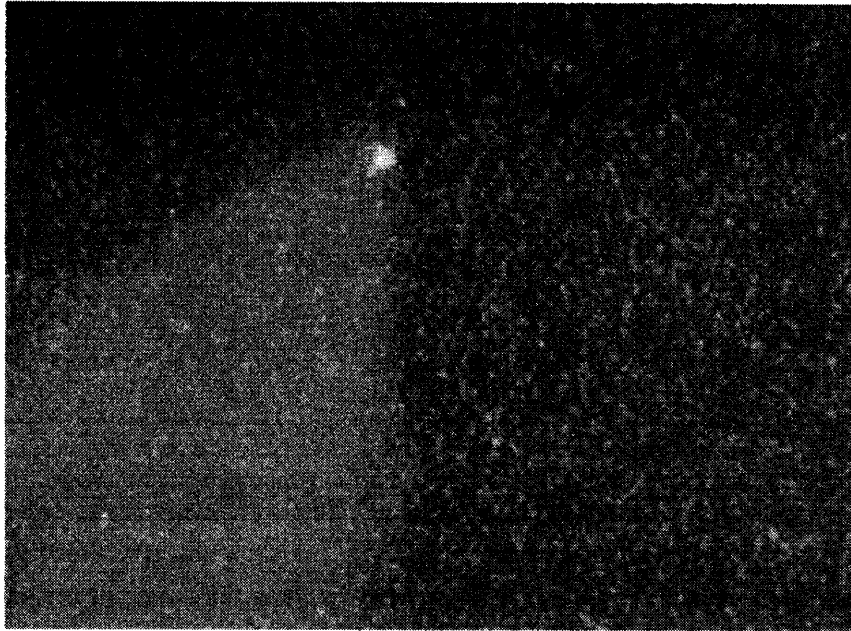
Tracking telescope at CRL used in the RIS experiment

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Table Target molecules and CO₂ laser lines

Molecule	CO ₂ laser Line	CO ₂ isotope	Wavenumber (cm ⁻¹)
O ₃	P(18)	636	1002.4778
	P(20)	636	1000.6473
CO ₂	P(26)	626	938.6883
	R(36)	636	938.7776
HNO ₃	P(8)	636	907.0528
CFC12	R(6)	636	918.74 - 923.11
	- R(12)		
CO	R(28)*	626	2166.96
	R(30)*	626	2169.27
N ₂ O	R(38)*	626	2178.002
CH ₄	R(14)**	626	2915.79
	R(16)**	626	2919.87
Reference	R(34)	636	937.5844
	R(8)*	626	2140.925
	R(26)**	626	2939.12

*Second harmonic; **Third harmonic.



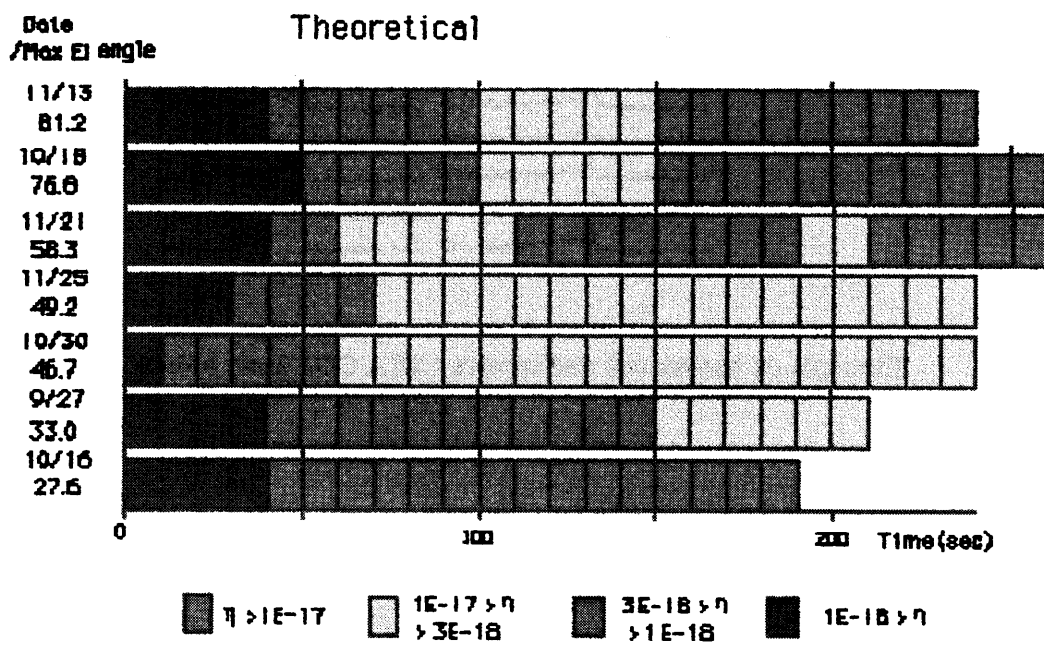
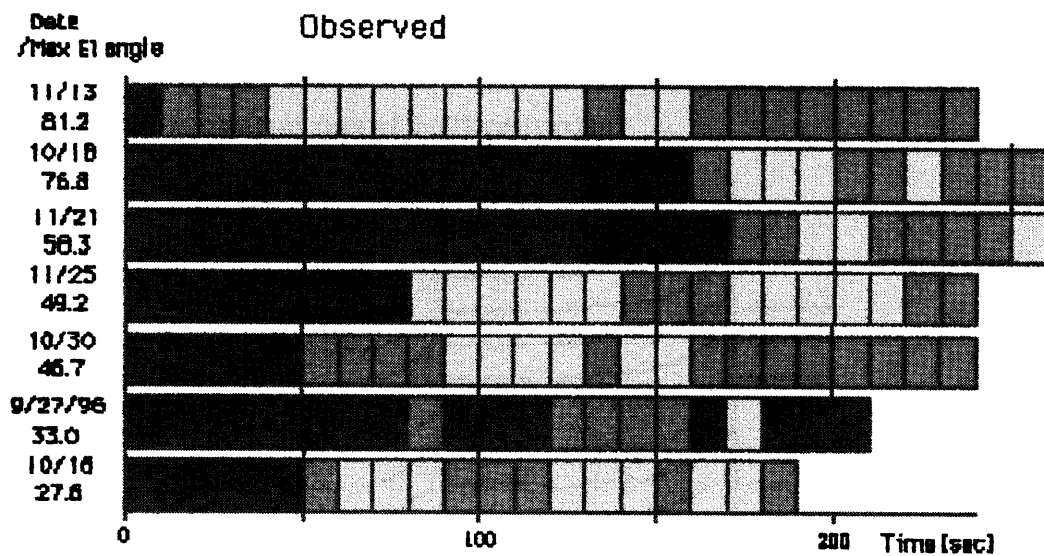
**ICCD camera image of the reflection of SH Nd:YAG
laser at 532 nm from the RIS.**

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**Reflection from the RIS at 532-nm taken with the ICCD
camera located in Coude optics. The field of view of the
ICCD is approximately 200 microradians.**

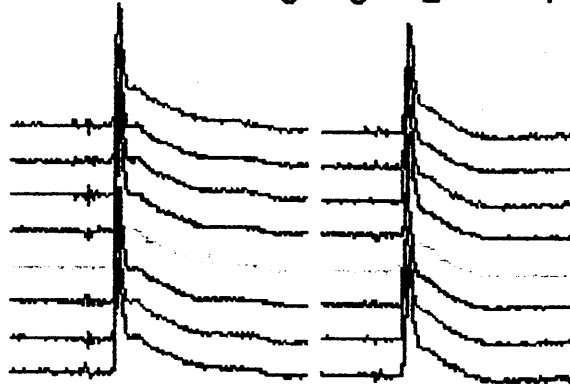
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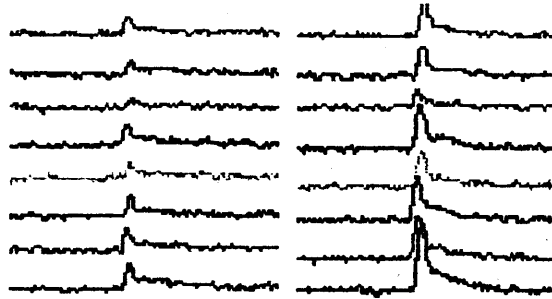
Measured and theoretical efficiency of reflection of RIS at 532 nm.

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Outgoing CO₂ laser pulses



Return pulses



Example of transmitted and received TEA CO₂ laser pulses.

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