Bi-Static Radar Experiment investigation of Didymos

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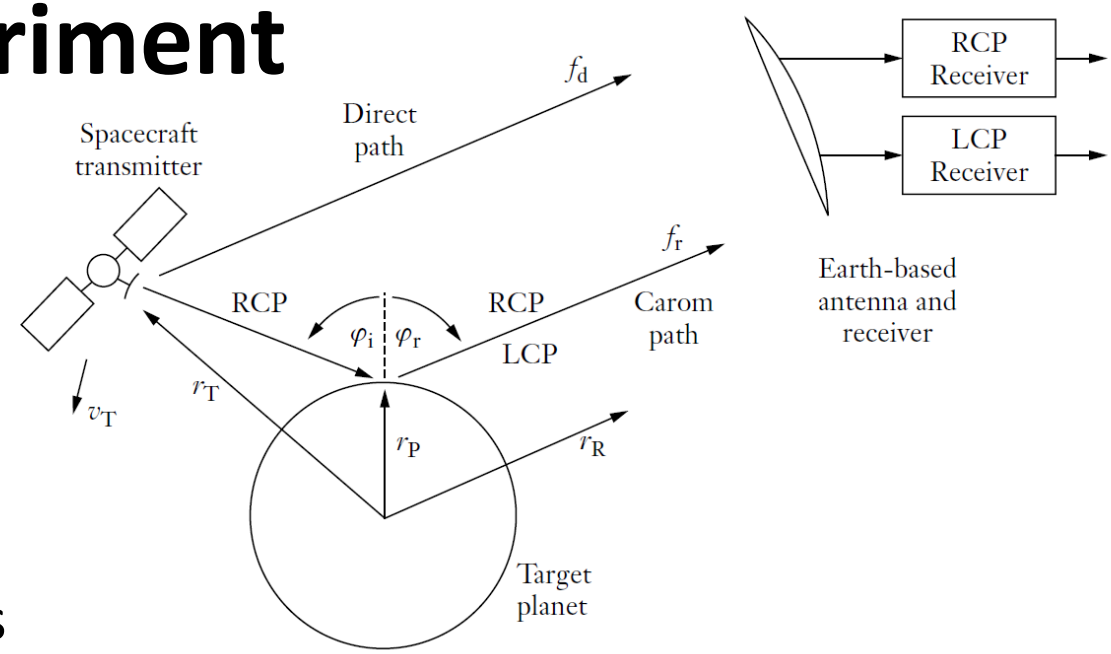
Bi-Static Radar Experiment



Radio Science

- No dedicated electronics
- S/C TMTC system Tx and Ground Stations Rx
- Signal scattered by Didymos' surfaces

Surface characterization

- Limited penetration (0.1 - 1m)
- Surface roughness
- Near surface permittivity (composition & porosity)
- Near surface features

Measurement

Telemetry signal

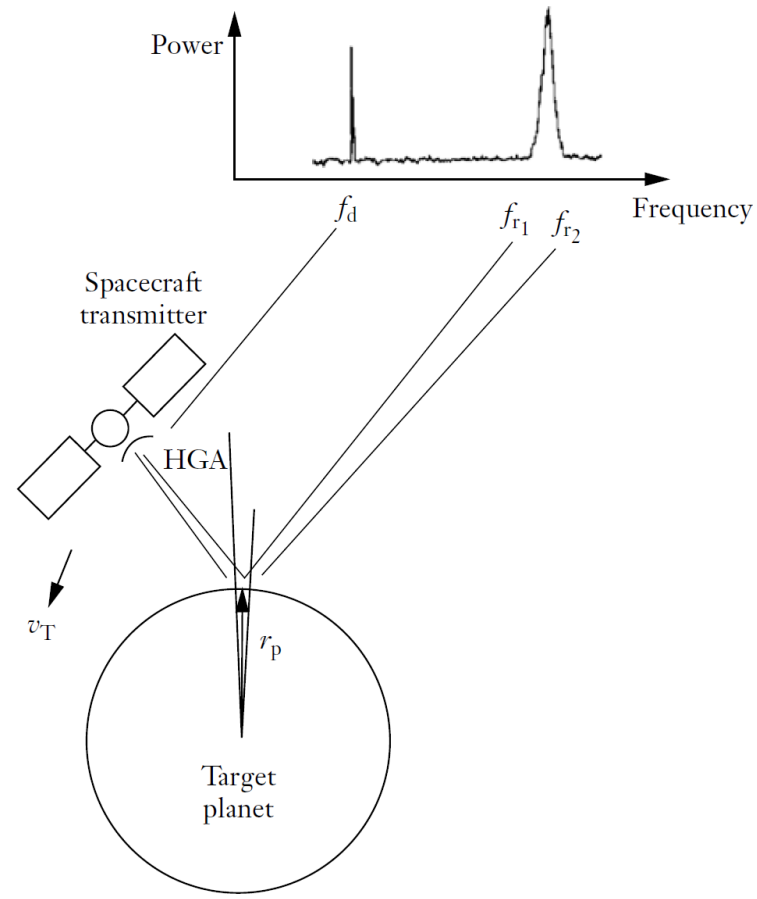
- X channel (main antenna or low gain antenna)
- Unmodulated / Modulated signal
- Beam limited

Full signal measurement on ground

- Doppler (USO or direct path)
- Delay (Relatif)
- Polarization (circular)
- Power

Processing

- SAR processing
- Simulation



Forward

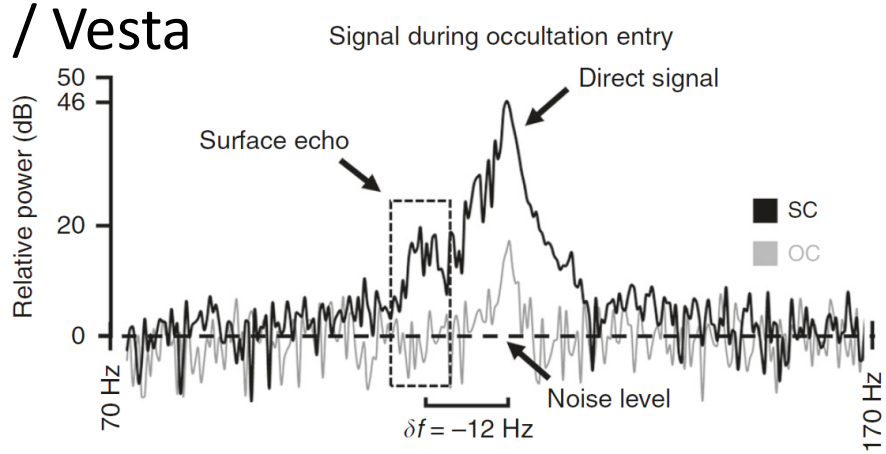
High incidence ($\varphi > 50^{\circ}$)

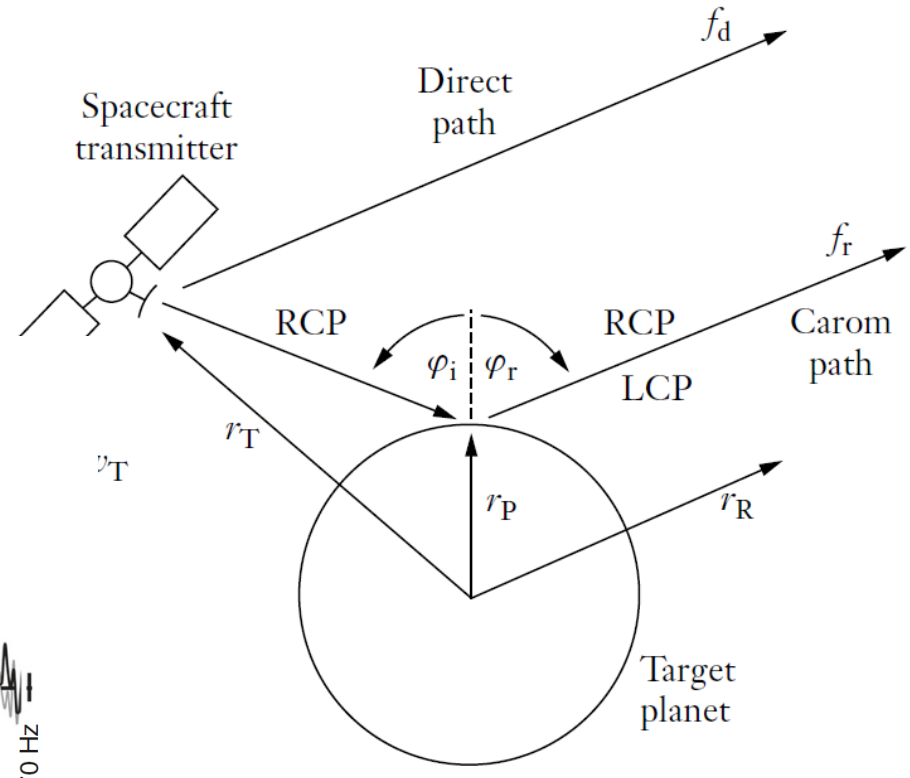
- Powerful Direct path : Doppler reference (wo USO)
- Occultation / Earth
- Unmodulated (if wo USO)

Measurement

- Roughness
- Low penetration

Dawn / Vesta





Backward

Low incidence ($\varphi < 50^{\circ}$)

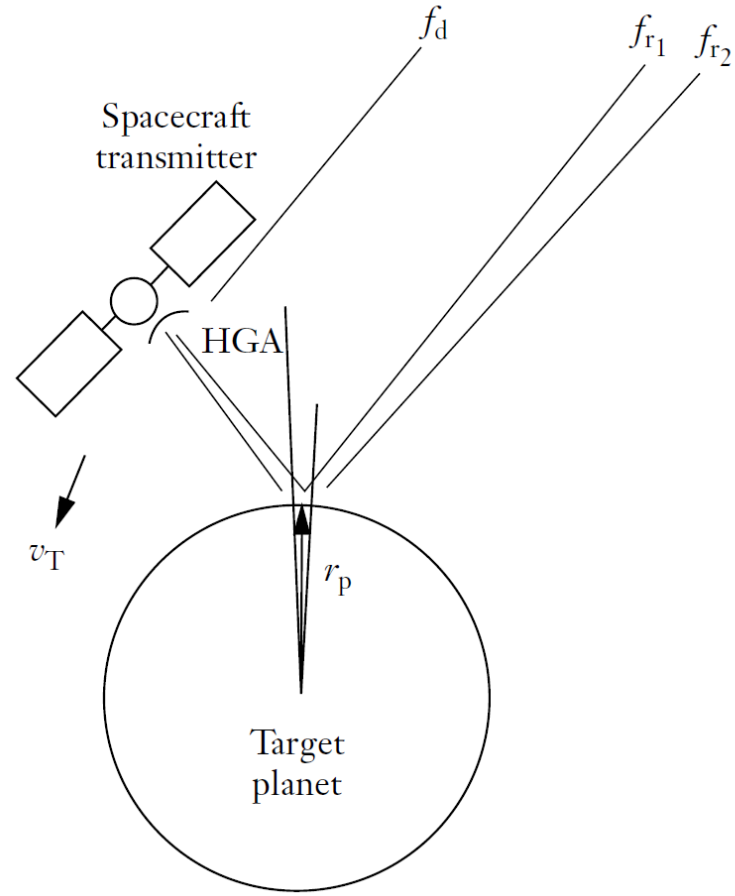
- Doppler reference tb study (USO?)
- Modulated
- Close to classical SAR

Measurement more rich

- Permittivity
- Roughness
- Larger penetration

Performances

- Geometry
- Configuration
- Ground stations time



Science objectives

Mains objectives

- Map of Roughness and Permittivity
- Identification of some near surface features
- Characterization of refresh material (main & crater)
- Dynamical state determination: moon and main

Synergies

- Shape modeling
- Ground based radar observation (Goldstone)

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