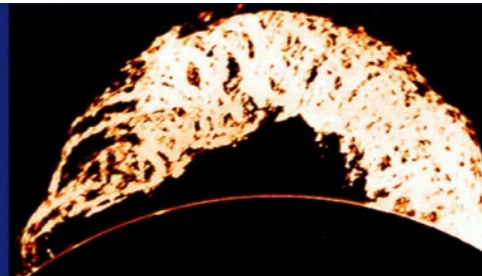
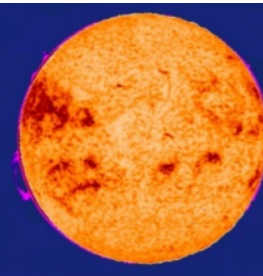
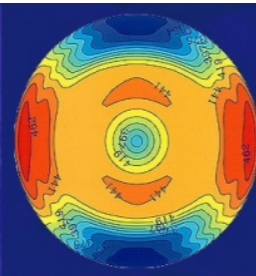


HAO



GBSON Concept

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NCAR

What Concept?

- The Ground-Based Solar Observatory Network
- Merger of US Air Force requirements for an operational asset with research components in the areas of magnetic field and helioseismology
- Partnership between NSO and HAO

What Concept?

- The Ground-Based Solar Observatory Network
- Requirements for research of magnetic field
- Partnership between NSO and HAO



What Concept?

- The Ground-Based Solar Observatory Network
- Merger of US Air Force requirements for an operational asset with research components in the areas of magnetic field and helioseismology
- Partnership between NSO and HAO

Caveat Emptor

- I am not the GBSON spokesperson.
- GBSON was proposed to the National Science Foundation in the Mid-Scale RI-1 program but not invited to submit a Step-2 proposal. There is no clear path forward at this time.

In the beginning...

- Toward the end of last year the Air Force Research Lab (AFRL) approached NSO and HAO with a request for a white paper on instrumentation to address Air Force needs for operational space weather monitoring and forecasting. NSO and HAO then wrote it in about 4 weeks.
- AFRL was very specific in their request

AFRL Key Observables

1. Sunspot location, area, classification
2. Chromospheric imaging for flare patrol
3. Coronal hole boundaries and polarity
4. Monitoring filaments and prominences
5. Photospheric magnetic field
6. CME detection, speed, width, and direction

AFRL Functional Requirements

- 3 Instruments:
 1. Magnetograph
 2. Full-Disk Imager
 3. Coronagraph
- It should be an operational facility: high availability, automation, fast data delivery, etc. But also modular for upgradeability.

Magnetograph

- Full requirements omitted by AFRL request

Full-Disk Imager

- Full requirements omitted by AFRL request

Coronagraph

- Full requirements omitted by AFRL request

Platform

- Full requirements omitted by AFRL request

Then...

- Nothing. Until about 4 weeks before the deadline for Step-1 proposals for the National Science Foundation (NSF) Mid-Scale Research Infrastructure solicitation.
- AFRL and NSF had been in contact and NSF requested that NSO/HAO submit a proposal for the AFRL network with science added on, e.g., from SPRING.

And GBSOON was born

- Science topics include:
- Magnetic boundary of the Heliosphere, open flux problem
- Eruptive structures
- Helioseismology

GBSON Instruments I

- Multi-Slit Scanning Spectro-Polarimeter
 - high sensitivity B field, ~50 cm aperture
 - photosphere (Fe I 1.56 μm) and chromosphere (He I 1083.0 nm)
- Imaging Spectro-Polarimeter
 - high cadence intensity, Doppler, B field
 - Fe I 617.3 nm, H I 656.3 nm, Ca II 854.2 nm, He I 587.6 and 1083.0 nm
 - Basically COSMO/ChroMag currently being constructed

GBSON Instruments II

- Internally occulted coronagraph
 - 1.05 – 3 R_{sun}
 - Basically COSMO/K-Cor currently in operation
- Externally occulted coronagraph
 - 2.5 – 6 R_{sun}
 - HAO instrument concept
- Helioseismic Doppler Imager
 - ~3 lines for multi-height diagnostics
 - Collaboration with SPRING here!

GBSON Observatory Concept I

- Coronagraphs cannot share a light feed
 - Internally-occulted requires super-polished uncoated singlet objective lens
 - Externally-occulted is in the shade
- ISP and MSSSP have wavelength overlap
- MSSSP requires ~50 cm aperture

GBSON Observatory Concept II

- Instruments are co-pointed on a single structure
- Central 50-cm telescope would feed light into a building with the MSSSP and HDI
- ISP and coronagraphs would have their own light feeds and mount on the sun-pointed structure

Some final remarks

- Most likely some agreement between NSF and the USAF is needed to develop GBSON.
- GBSON will have to be an operational resource for the USAF.
- Site selection criteria include low sky brightness for coronagraphs.