ferent methodologies for cross-calibration. This can be particularly important for plasma instruments, where multipoint measurements greatly enhance the scientific productivity. Because the data are time series rather than maps, cross-calibration is in some senses less easy to plan with specific events. In general what is required is a stable and isotropic environment. Some regions or periods during mission operation may be more appropriate than others, such as long undisturbed intervals in the unperturbed Solar Wind. These can only be recognized as the information becomes available. However, it is very productive to identify the desired criteria beforehand and to establish communication links between participants that will allow implementation of coordination as the opportunity arises.

X-ray solar monitors, for example, represent a special case of this situation. X-ray fluorescence spectrometers rely on a well-measured input solar spectrum for quantitative elemental analyses. The lunar emission is particularly dependent on the intensity of solar illumination at energies immediately above (higher than) the fluorescence line. Because the activity of the Sun is highly variable, continuous monitoring of the solar X-ray spectrum is essential. Such solar monitor data may be readily shared between missions, provided that good cross-calibration of the monitors is achieved. Combining data from two spacecraft greatly reduces the unknowns in the continuous time series required. In this case, since in theory both instruments are observing simultaneously, the challenge is to ensure that the timings and pointing directions of the two instruments are well defined and understood.

4.2. Importance of repeat measurements and stability tests

Although all of the lunar missions have limitations in surface coverage and duration of mission operations and/or constraints on the amount of data that can be downlinked over a given period, there is significant value in measuring the same target more than once. This is particularly true for optical instruments. All near-future planned missions are in circular polar orbits (not Sun-synchronous), and the solar incident geometry of measurements for individual targets will thus vary each month. Since the target itself will not change over the timescale of an orbital mission, a time sequence of measurements at different geometries allows photometric models to be accurately tested. Similarly, a given solar illumination for a target will be similar twice a year and repeat measurements would allow the stability of instrument through-put to be monitored.

Because spacecraft resources are inevitably limited, we recommend the Apollo 16 target be the prime target for such repeat measurements. For narrow field of view instruments, this may require planning measurements using off-nadir pointing. However, since coverage is most limited for equatorial areas, we also recommend the high latitude North Schrödinger site as a secondary target for repeat calibration. The smooth terrain along the central part of this target area provides a good site for stability tests and will be more readily accessible for repeat measurements.

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