TSIS provides the TSSI Climate Data Record

- Solar irradiance variability is the only external forcing of the climate system. Reliable knowledge of solar forcing is crucial to quantifying all climate forcing, including those of natural and anthropogenic origin.

- The Total and Spectral Solar Irradiance Sensor (TSIS) provides two measurements critical for determining natural (solar) influences on Earth's climate:
  1. Total solar irradiance (TSI), a continuing 35-year uninterrupted measurement record of incoming solar radiation, is a dominant energy source driving the Earth's climate, and provides the most precise insights into changes in the Sun's energy output.
  2. Spectral irradiance measurements provide the wavelength-dependent variability of the solar spectrum, which is critical for understanding the Earth's climate responses to solar variability.

- TSIS SIM is the newest TSI instrument, benefiting from newly improved ground calibration facilities and has better accuracy and stability than any other TSI instrument.

- The TSIS SIM, with its long and continuous high precision record, provides the measurement constraints of the total solar irradiance available to drive the climate system. The newer SIM measurements provide the details to resolve the higher-order mechanisms and terrestrial interactions responsible for climate dynamics.

- Both instruments are capable of understanding the natural influences on climate, and thus both were selected as part of the TSIS CDR.

**Super Strypi Missile**

1) Low Cost Launch ($10M, Vehicle and Launch support)

- The solid-fueled Super Strypi (SPARK) Missile is launched from Sandia National Laboratories, the University of Hawaii, and Aerotech. The rocket is based on an enlarged version of Sandia's Strypi sounding rocket.

- The LMB is fully integrated with the TSIS instruments to produce an optimal system for sounding rocket launch environment.

- The LASP Micro (Mighty) Bus (LMB) is a high performance bus delivered for $5.5M/copy.

- Technology is currently available to produce a low-cost constellation of overlapping space assets launched at an optimal interval for robust and continuous monitoring of TSSI that will fulfill the national interest.

- By managing and optimizing all of the TOMC interfaces (LASP Micro Bus and TSIS instruments, LASP operations and data processing and the Sandia Super Strypi launch vehicle) within LASP's systems engineering organization, and combining with the NASA light-touch management of a PI-mode mission, TOMC will provide the TSSI CDRs for 25 years at less than $10M/year.

- This implementation is ready to go and should start with funding in 2015 to help minimize the risk to the TSSI CDR.

**Conclusion**

- Implementation Cost and Schedule

  - Spacecraft fully integrated into Operations Environment
  - Interface control between hardware, software, test, and verification
  - All design and operations allow for optimization and automation of spacecraft hardware and software to provide a lowest cost approach to autonomous operations and data processing.

- Total and Spectral Solar Irradiance 25 year Acquisition through TOMC Implementation

  - The TSIS provides the TSSI Climate Data Record

  - Keys to Successful Implementation

  - Super Strypi Orbital Launch Performance (ORS-4) Exceeds TOMC Requirements

  - LMB is a high performance bus delivered for $5.5M/copy

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  - Technology is currently available to produce a low-cost constellation of overlapping space assets launched at an optimal interval for robust and continuous monitoring of TSSI that will fulfill the national interest.

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