The Tropospheric Emission: Monitoring of Pollution (TEMPO) mission will observe Earth’s atmosphere in ultraviolet and visible wavelengths to determine concentrations of key atmospheric pollutants across North America. This data will advance air quality research by determining how air pollution affects climate change and air quality on a continental scale.
TEMPO utilizes a geostationary ultraviolet/visible (UV/Vis) spectrometer to provide regional, hourly measurements of ozone, nitrogen dioxide, sulfur dioxide, formaldehyde and aerosols during daylight hours. For the first time, the spectrometer will provide Earth scientists with high resolution and frequency observations from Mexico City to Canada, and from coast to coast. The instrument will track pollution at micro urban scales (an area approximating 1.25 by 2.8 miles), improving air quality prediction accuracy by an expected 50 percent.

With an anticipated delivery date in mid-2017 and a 2-year design life, TEMPO will share a ride on a commercial satellite as a hosted payload to an orbit about 22,000 miles above Earth’s equator.

TEMPO is NASA’s first Earth Venture Instrument mission; Earth Venture missions are small, Principle Investigator led, cost-capped, and focused research investigations that support larger NASA missions. TEMPO will also be the first space-based UV/Vis light air quality spectrometer in geostationary orbit.

Ball Aerospace is responsible for building TEMPO’s spectrometer and telescope using a two-axis scan mirror. With more than 30 years of experience developing UV/Vis spectrometers, Ball will draw on its other successful programs, such as the James Webb Space Telescope and the Ozone Mapping Profiler Suite for the TEMPO project.

In tandem with TEMPO, Ball is also producing the Geostationary Environmental Monitoring Spectrometer (GEMS), a joint development effort by Ball and the Korea Aerospace Research Institute (KARI), South Korea. The instruments share much of the same technology, resulting in design and production efficiencies.

Built under a firm-fixed price contract with NASA’s Langley Research Center, TEMPO’s spectrometer exemplifies our long-standing expertise in producing cost-effective solutions for Earth observation and remote-sensing missions.

TEMPO is Ball’s first civil instrument in geostationary orbit and the first Ball instrument to be hosted on a geostationary communications satellite.