



Propellant Management Services

COMSAT Technical Services provides propellant management using its patented and flight-proven Propellant Gauging System (PGS).

The services include an accurate estimate of a satellite's mono or bipropellant remaining load, balancing propellant load in multi-tank configurations, and balancing ISP.

This service provides a propellant remaining estimate that is more accurate and reliable than that determined by the bookkeeping or PVT methods at spacecraft end of life (EOL). Accuracies equivalent to two months of satellite maneuvering life can be achieved.

The Propellant Management will:

- Support satellites from any manufacturer
- Allow the operator to balance propellant loads between tanks
- Improve ISP
- Optimize propellant movement (thermal pumping) between tanks
- Reduce risk of accidental tank depletion due to thermal pumping

The Propellant Gauging System (PGS) will:

- Estimate the propellant remaining
- Identify the accuracy of the estimate
- Determine the propellant remaining in each tank in multi-tank systems
- Support satellites from any manufacturer
- Assist propellant management
- Collect test data without risk to the satellite or disruption of operations

Flight Verification of PGS Method:

- Three satellites have been de-orbited
 - Two satellites LM 5000 and one BSS 601
 - The difference between predicted propellant load and propellant used to supersync was:
 - less than 2kg for LM5000
 - less than 1kg for BSS 601
- Predicted propellant loads for 16 depleted tanks for satellites currently in flight
 - Average error was about 1kg per tank

Propellant Management Group

**2006 Recipient of the U.S. Air Force Chief of Staff
Team Excellence Award for Extending Satellite Mission Life**

... provided unique propellant gauging and fuel management expertise and tools to support this important challenge.In particular our President & CEO highlighted that, by extending the life of s/c by at least 6 months, their efforts saved the company significant \$\$ by delaying the traffic transfer to its replacement satellite."

– Letter from TeleSat

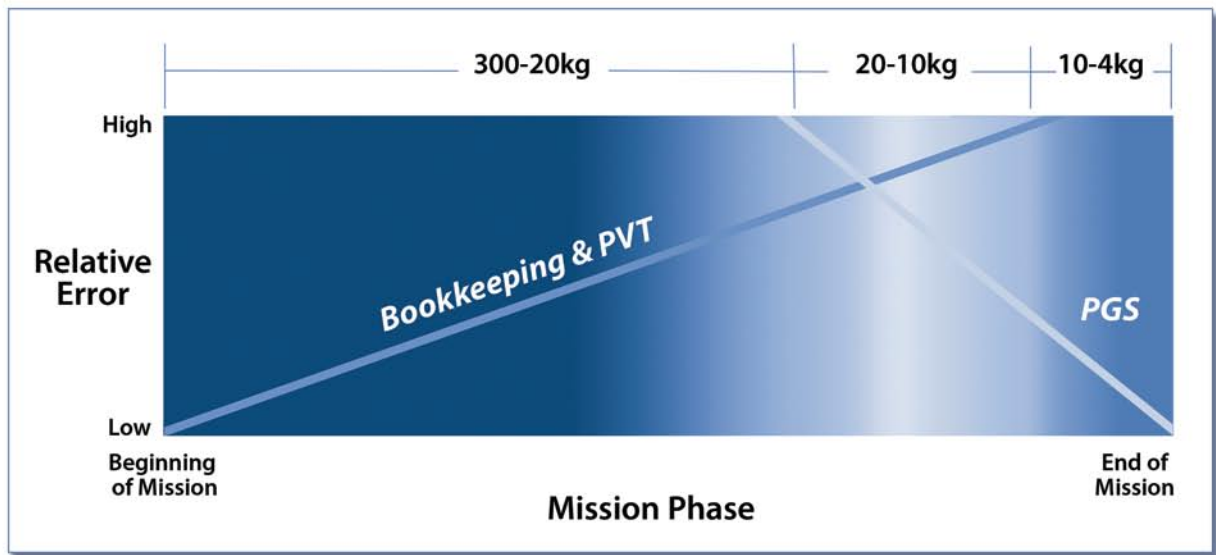
The PGS benefits include:

- Cost savings by increasing the useful life of a satellite
- The ability to accurately predict when new on-orbit resources must be procured
- Saving money by delaying spacecraft orders (early orders unnecessary)
- The capability to maximize the mission by managing propellant remaining
- The ability to accurately estimate the time to move a satellite out of geosynchronous orbit and to meet requirements for minimum propellant load
- A propellant-remaining safety margin at satellite EOL
- Accuracy that increases with time and diminishing propellant load

COMSAT provides direct support, consulting, and supervision of preparation of the PGS operation and its execution. Initial results are available within a short period of time from routinely collected telemetry data. More accurate results obtained from the fully developed system model are available in two to three months.

Propellant Management including the PGS Method was successfully applied to Satellites:

- Astrium/EDS Eurostar 2000
- Boeing SS601
- LM A2100, Ax2100
- LM (RCA Heritage) Series 3000, 5000, and 7000
- LM (GE Astrospac Heritage) DSCS III



Using PGS, the uncertainty in the estimation of the remaining propellant supply is decreased dramatically toward the spacecraft EOL, resulting in accurate estimates of the spacecraft's useful life and replacement requirements.

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