Large-Strain Transparent Magnetoactive Polymer Nanocomposites

A document discusses polymer nanocomposite superparamagnetic actuators that were prepared by the addition of organically modified superparamagnetic nanoparticles to the polymer matrix. The nanocomposite films exhibited large deformations under a magnetostatic field with a low loading level of 0.1 wt% in a thermoplastic polyurethane elastomer (TPU) matrix. The maximum actuation deformation of the nanocomposite films increased exponentially with increasing nanoparticle concentration.

Thermodynamic Vent System for an On-Orbit Cryogenic Reaction Control Engine

A report discusses a cryogenic reaction control system (RCS) that integrates a Joule-Thompson (JT) device (expansion valve) and thermodynamic vent system (TVS) with a cryogenic distribution system to allow fine control of the propellant quality (subcooled liquid) during operation of the device. It enables zero-venting when coupled with an RCS engine. The proper attachment locations and sizing of the orifice are required with the propellant distribution line to facilitate line conditioning. During operations, system instrumentation was strategically installed along the distribution/TVS line assembly, and temperature control bands were identified.

Time Distribution Using SpaceWire in the SCaN Testbed on ISS

A paper describes an approach for timekeeping and time transfer among the devices on the CoNNeCT project’s SCaN Testbed. It also describes how the clocks may be synchronized with an external time reference; e.g., time tags from the International Space Station (ISS) or RF signals received by a radio (TDRSS time service or GPS).

All the units have some sort of counter that is fed by an oscillator at some convenient frequency. The basic problem in timekeeping is relating the counter value to some external time standard such as UTC.

With SpaceWire, there are two approaches possible: one is to just use SpaceWire to send a message, and use an external wire for the sync signal. This is much the same as with the RS-232 messages and 1 pps line from a GPS receiver. However, SpaceWire has an additional capability that was added to make it easier — it can insert and receive a special “timecode” word in the data stream.