

## Ball Aerospace Delivers Cryostat to University of Arizona for NASA Balloon Mission

**NASA's GUSTO balloon mission will map out large sections of the Milky Way galaxy and the nearby galaxy known as the Large Magellanic Cloud**

BOULDER, Colo., April 2, 2020 /PRNewswire/ -- Ball Aerospace recently delivered a cryostat to the University of Arizona for NASA's Galactic/Extragalactic Ultralong-Duration Balloon Spectroscopic Terahertz Observatory (GUSTO), a long-duration balloon mission that will map out parts of the Milky Way and Large Magellanic Cloud galaxies to determine the life cycle of interstellar gas, witness the formation and destruction of star-forming clouds, and understand the dynamics and gas flow in the vicinity of the center of the Milky Way.

The Ball-built cryostat is a low-heat leak tank that contains liquid helium and is designed to keep the GUSTO instrument cool during the entire length of the planned balloon flight.

"We are honored to work with the University of Arizona on NASA's GUSTO mission, which will measure emissions from the interstellar medium, or the cosmic material found between stars," said Dr. Makenzie Lystrup, vice president and general manager, Civil Space, Ball Aerospace. "Ball is an industry leader in designing and developing cryogenic systems, which includes our cryogenic center of excellence for the development of unique cryogenic products such as the cryostat for the GUSTO mission."

GUSTO, which is part of NASA's Astrophysics Explorers Program, is scheduled to launch from Antarctica in 2021. The University of Arizona's Chris Walker is the GUSTO mission principal investigator. Johns Hopkins University Applied Physics Laboratory will provide the mission operations.

Ball has more than 40 years of experience developing cryogenic spaceflight systems and more than 25 years of developing cryocoolers. The cryogenic experience includes cryogenic cooling systems such as cryostats, cryoradiators, cryocoolers and thermoelectric coolers. For example, Ball developed the cryocooler for NASA's Thermal Infrared Sensor-1 (TIRS-1) and TIRS-2. TIRS-1 is flying onboard Landsat 8 and Ball delivered the TIRS-2 cryocooler in 2018 to NASA Goddard for the Landsat 9 satellite.

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manufacturing changes, including the start up of new facilities and lines; failure to achieve synergies, productivity improvements or cost reductions; mandatory deposit or other restrictive packaging laws; customer and supplier consolidation; power and supply chain interruptions, including due to virus and disease outbreaks; potential delays and tariffs related to the U.K's departure from the EU; changes in major customer or supplier contracts or a loss of a major customer or supplier; political instability and sanctions; currency controls; changes in foreign exchange or tax rates; and tariffs, trade actions, or other governmental actions, including business restrictions and shelter-in-place orders in any country affecting goods produced by us or in our supply chain, including imported raw materials, such as those related to COVID-19 and those pursuant to Section 232 of the U.S. Trade Expansion Act of 1962 or Section 301 of Trade Act of 1974; b) our aerospace segment include funding, authorization, availability and returns of government and commercial contracts; and delays, extensions and technical uncertainties affecting segment contracts; c) the company as a whole include those listed plus: the extent to which sustainability-related opportunities arise and can be capitalized upon; changes in senior management, succession, and the ability to attract and retain skilled labor; regulatory action or issues including tax, environmental, health and workplace safety, including U.S. FDA and other actions or public concerns affecting products filled in our containers, or chemicals or substances used in raw materials or in the manufacturing process; technological developments and innovations; the ability to manage cyber threats and the success of information technology initiatives; litigation; strikes; disease; pandemic; labor cost changes; rates of return on assets of the company's defined benefit retirement plans; pension changes; uncertainties surrounding geopolitical events and governmental policies both in the U.S. and in other countries, including policies, orders and actions related to COVID-19, the U.S. government elections, budget, sequestration and debt limit; reduced cash flow; interest rates affecting our debt; and successful or unsuccessful joint ventures, acquisitions and divestitures, and their effects on our operating results and business generally.

#### SOURCE Ball Aerospace

For further information: Media Contact: Joanna Climer, (303) 939-7041, [jclimer@ball.com](mailto:jclimer@ball.com); or Investor Relations: Ann Scott, (303) 460-3537, [ascott@ball.com](mailto:ascott@ball.com)

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