Ball News Releases

Ball Aerospace Selected by NASA for Three Studies to Develop Future Sustainable Land Imaging Technologies

BOULDER, Colo., Sept. 14, 2020 /PRNewswire/ -- Ball Aerospace was selected by NASA to move forward with three studies to develop and demonstrate innovative Sustainable Land Imaging (SLI) technologies for potential use on future missions of the Landsat program, a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey that is entering its fifth decade of existence.

The studies leverage previous SLI Technologies, including the Ball-built Operational Land Imager 2, which will fly on the Landsat 9 mission launching in 2021.

"We are honored and excited that Ball was chosen by NASA for three studies to explore next-generation technologies for the Landsat Program," said Dr. Makenzie Lystrup, vice president and general manager, Civil Space, Ball Aerospace. "These studies reflect the importance of continued advancement and the development of creative solutions. We are pushing the boundaries of what's possible when it comes to innovating robust, precisely-calibrated sensors in increasingly compact packages."

The selection came on the heels of the final airborne scienceflights of two other Sustainable Land Imaging (SLI) technology demonstrations – the Reduced Envelope Multispectral Imager - Airborne (REMI-AB) and the Compact Hyperspectral Prism Spectrometer - Airborne (CHPS-AB). Both were designed to demonstrate improved Landsat mission performance in compact instrument packages.

The three studies include:

- **Landsat Calibration Satellite (LCS)** – This study builds on the CHPS instrument and aims to provide the cross-calibration and validation capability required to knit together a future Land Imaging Constellation. LCS-B focuses on the key technical challenges to providing an on-orbit reference instrument – specifically, differences in spatial and spectral performance between disparate platforms, such as Sentinel-2, Planet, and Landsat-8.
- **TransCal** – This is an innovative calibration approach using Polymer Dispersed Liquid Crystal material to continue the precise on-orbit calibration method used extensively in the Landsat program, while significantly reducing the size and complexity of the calibration subsystem. This study aims to reduce resources needed (e.g., cost, size, volume and mass) for next-generation SLI instruments, while meeting or exceeding the current Land Imaging capabilities.
- **Reduced Envelope Multispectral Infrared Radiometer (REMIR)** – This study will design and build a single, full spectral range (visible through thermal infrared) instrument suite that represents the next step in meeting the thermal infrared band requirements for future Landsat missions. The proposed technology leverages the previous success of the REMI instrument, as well as NASA and Ball investments in new detectors, innovative calibration subsystems (e.g. the NASA Compact Infrared Radiometer in Space CubeSat mission, built by Ball and currently in orbit) and a scanning approach that enables significant reductions in size, weight
  , and power compared to the existing Landsat architecture.

Ball Aerospace has more than six decades of experience providing leading-edge systems and instruments to help predict the weather, map air quality and monitor the Earth's environment. Ball has played a key role in the continuity of the current Landsat

program having built the OLI instrument flying on the Landsat 8 satellite and the OLI-2 instrument for Landsat 9. As a partner on the NASA SLI-Technology program, Ball has developed and demonstrated innovative instruments that provide for a flexible and sustainable next-generation Landsat architecture.

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Forward-Looking Statements

This release contains "forward-looking" statements concerning future events and financial performance. Words such as "expects," "anticipates," "estimates," "believes," "targets," "likely," "positions" and similar expressions typically identify forward-looking statements, which are generally any statements other than statements of historical fact. Such statements are based on current expectations or views of the future and are subject to risks and uncertainties, which could cause actual results or events to differ materially from those expressed or implied. You should therefore not place undue reliance upon any forward-looking statements and any such statements should be read in conjunction with, and, qualified in their entirety by, the cautionary statements referenced below. The company undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. Key factors, risks and uncertainties that could cause actual outcomes and results to be different are summarized in filings with the Securities and Exchange Commission, including Exhibit 99 in our Form 10-K, which are available on our website and at www.sec.gov. Additional factors that might affect: a) our packaging segments include product capacity, supply, and demand constraints and fluctuations, including due to virus and disease outbreaks and responses thereto; availability/cost of raw materials and logistics; competitive packaging, pricing and substitution; changes in climate and weather; footprint adjustments and other manufacturing changes, including the startup 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,; 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 or jurisdiction 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, stimulus package(s), 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.

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