

The Challenges of Shipborne Weather Balloon Launches

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Deployment

The second ARM Mobile Facility (AMF2) was deployed aboard the Horizon Spirit in support of the Marine ARM GPCI Investigation of Clouds (MAGIC) campaign. MAGIC takes place from October 2012 through September 2013 during which time the Spirit will traverse the Pacific Ocean between Los Angeles, CA and Honolulu, HI.

Radiosonde launches take place aboard the ship every six hours during normal operation scheduling and every three hours during IOP campaigns. Making successful launches aboard a cargo ship has proven to be a very challenging task.



Launch Challenges

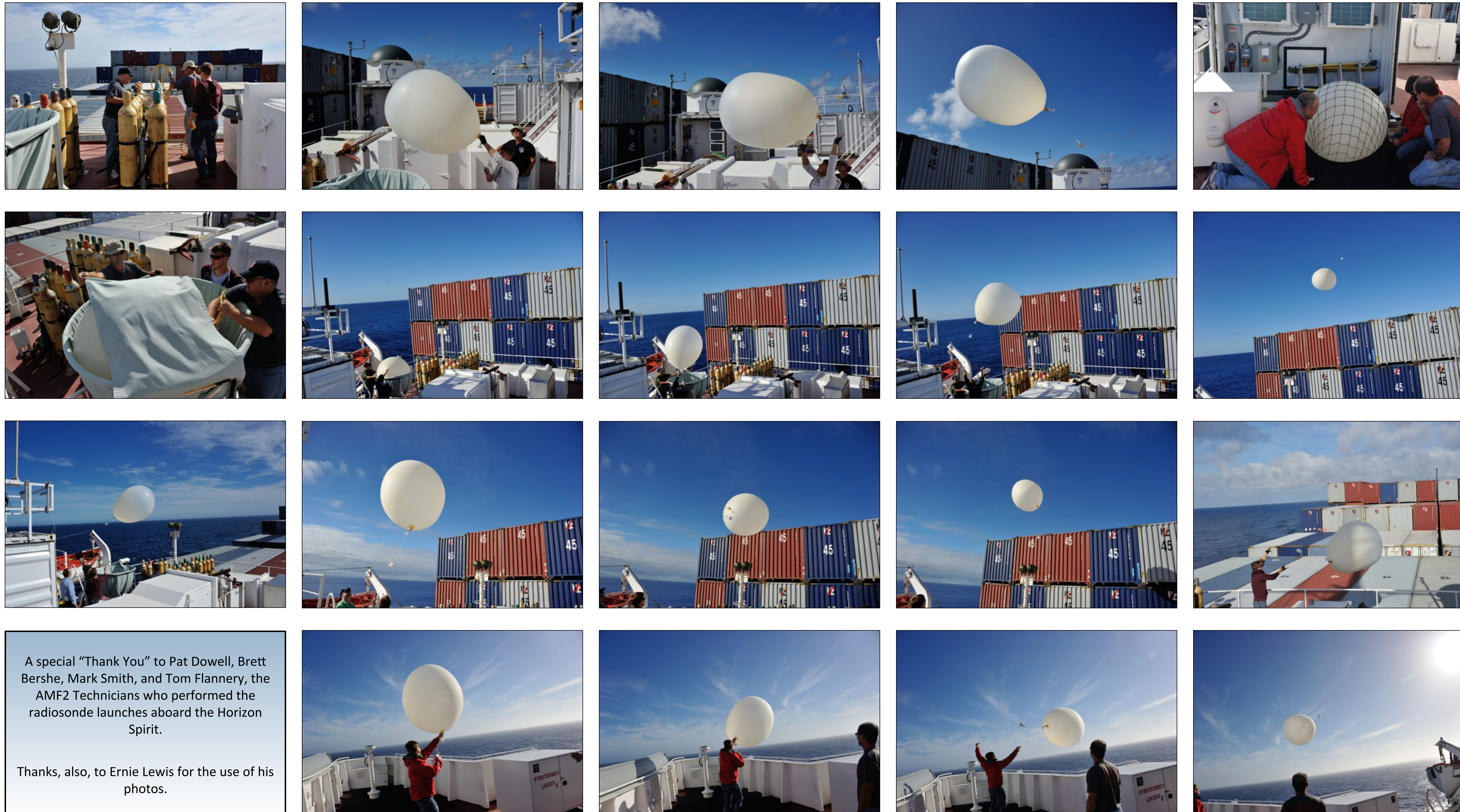
The ship travels at a speed between 16-21 knots (8.0-10.5 ms⁻¹) and, when combined with prevailing winds, can produce challenging conditions in which to maneuver an inflated 350g weather balloon. In addition to winds, the technical team had to manage getting the balloon over an approximately 16 feet high wall of cargo containers that were positioned to the aft of their launch site. Turbulence and airflow over and around the containers created a large obstacle to overcome. The successful launch rate is estimated to be 85%, meaning that 15% of the time radiosondes were pulled into the cargo, damaging the radiosonde, or that surface conditions were too rough for a launch to take place safely. Given this tremendous task, we are extremely happy with the skill and success of the technicians.

The AMF2 employs a Vaisala DigiCORA-III MW31 Balloon-Borne Sounding System to make radiosonde launches on the Horizon Spirit. The sounding system collects its location via GPS during the launch start-up cycle. Because, typically, 15-30 minutes elapse during the system logging its position and the actual time of balloon release, the ship has moved appreciably causing an incorrect surface location to be reported in the data. To overcome this offset, all radiosonde launch data is reprocessed using more accurate latitude/longitude information gathered from the onboard NAV system.

Launch Statistics

October 1, 2012 – January 12, 2013

Successful Launches: 229	Average Latitude Correction: 0.042 degrees
Legs Completed: 15	Average Longitude Correction: 0.108 degrees
Launch Success Rate: 85%	



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