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## NASA'S NEXT CHALLENGE

The loss of NASA's long-awaited $CO_2$ detector, the Orbiting Carbon Observatory (OCO), which last week ended up in the ocean rather than in orbit, is a hard blow not only to the team who devoted much of the last decade to getting it off the ground but also to scientific research. With emissions rising and a global climate deal in the balance, pinpointing the origin and fate of carbon dioxide has never been more urgent — a task that the US$280-million mission would have accomplished skilfully (page 38).

Although Japan's Greenhouse Gases Observing Satellite (GOSAT), launched in January, will also measure carbon dioxide and will undoubtedly provide some of the same data anticipated from OCO, the NASA satellite would have offered an unprecedented spatial resolution. Designed to circle the globe 14.5 times per day, taking half a million $CO_2$ measurements *en route*, OCO would have located specific sources of the greenhouse gas, differentiating cities and freeways from adjacent forested areas. In the absence of its US counterpart, GOSAT must now verify its readings from the 100 or so ground stations where atmospheric $CO_2$ is measured manually twice per month. Their spotty coverage — oceans are omitted, as are entire continents — is testimony that the launch of OCO was well overdue.

NASA should now make every effort towards a rapid re-launch. Launching a replacement OCO within the current operational phase of GOSAT, which will remain in orbit for five years, would allow at least a brief period of data verification between the two satellites. But reaching orbit early in the first commitment phase of a post-2012 global climate deal should be of equal — if not higher — priority. After all, while OCO was intended as an exploratory science mission, the ability to easily identify carbon heavyweights from space would have had notable political implications.

The loss of OCO also makes clear the urgency of modifying or replacing the Taurus XL rocket, whose malfunction caused the crash. This incident brings the failure rate of the Taurus XL to 25 per cent, and with it comes another unfortunate consequence for climate science. The Glory mission, which would have also used a Taurus XL and has now been postponed, was due to carry with it two unique instruments: one to measure the distribution of various atmospheric aerosols and another to continue collection of total solar irradiance data for the long-term climate record.

Whether NASA has the spare key parts needed to rapidly rebuild the OCO satellite is, as of yet, unclear. Even in their absence, however, a replacement should not require anything near the original costs in time or money. After all, OCO was selected from fierce competitors mainly owing to its reliance on existing and relatively cheap technology, assets that could enable the quick turnaround of a successor. With NASA having recently received US$400 million for Earth and climate research, a re-launch should be both within its capability and high among its priorities.

OLIVE HEFFERNAN, EDITOR

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