

9. CLOSING THOUGHTS

The 2007 Decadal Survey (DS) “Earth Science and Applications from Space” was a first for the NASA Earth Science Division (ESD). While the recommendations were broadly endorsed by the U.S. Earth science and applications communities, it became apparent that assumptions made in the 2007 DS regarding future ESD budgets were optimistic. Faced with this situation, ESD initiated an unprecedented strategy of funding all 9 of the so-called Tier-1 and Tier-2 missions to conduct mission definition studies to help guide planning and preparation for potential new mission formulation. This approach has proven exceptionally fruitful in the case of GEO-CAPE.

GEO-CAPE was a challenging fit in the ESD program, especially in a constrained budgetary environment, because of its geostationary orbit and notional payload of multiple instruments serving two very different sets of observing requirements. The study team leaders developed a strategy to engage the broadest possible range of stakeholders, including multiple NASA centers, federal partners, and universities. In addition to conducting the required concurrent-engineering design studies and technology assessments, study team funding provided effective seeds for building and maintaining broad stakeholder involvement. Team members were able to leverage other ongoing activities to support focused GEO-CAPE needs at low cost to the program, and in many cases contributed their efforts at no cost. After 2–3 years of study and vigorous debate, the team came to consensus that the best strategy for GEO-CAPE was to avoid scope creep, constrain costs, and remain as small and flexible as possible to enable most of the science of GEO-CAPE to be accomplished sooner rather than waiting until later to accomplish “all” the science. The EV-I TEMPO mission, EV-M GeoCARB mission, and multiple other well-rated proposals to the EV solicitations are fruitions of this spirit.

The 2017 DS reiterates the highest importance of GEO-CAPE atmospheric and coastal ocean science. The atmospheric observations are now largely being implemented as part of the Program of Record. Remaining components of GEO-CAPE, including aerosols, greenhouse gases, and trace gas vertical profiles, appear in recommended Designated and Explorer missions. It is gratifying to see that teaming lessons learned from the GEO-CAPE experience are apparently being adopted and improved upon for the 2017 DS mission studies. While the GEO-CAPE study team approach of funding many small competed activities succeeded in fostering broad community engagement, planning and managing this approach on an annual basis made it unnecessarily challenging to undertake activities requiring multiple years (for example the development of frameworks for observing system simulation experiments). The collaborative multi-Center, broad-stakeholder, multi-year approach being undertaken by ESD for the 2017 DS Designated missions appears promising for continuing to advance critical needs for Earth science and applications. The study team again expresses its thanks to ESD leadership for its vision in constructing these “first DS” study teams and sustainably funding them over a period of years. It is the team’s belief that ESD obtained excellent value from its investment.