

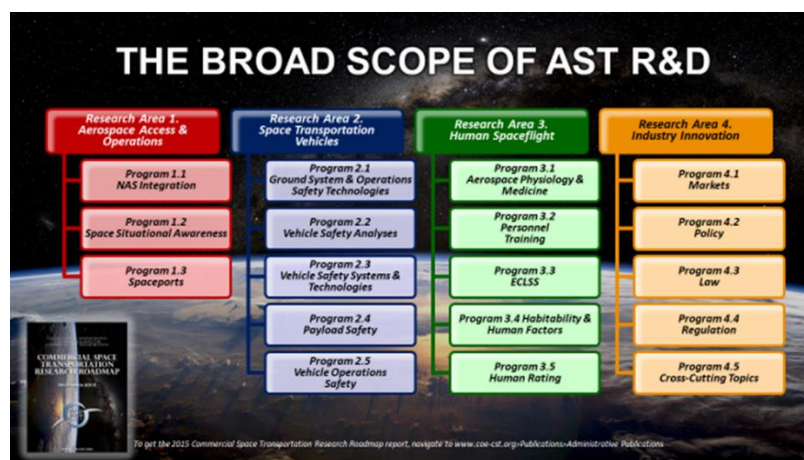
# COMSTAC ANALYSIS OF FAA AST'S R&D CONSORTIUM

## Introduction to the COMSTAC

Established in 1984, the Commercial Space Transportation Advisory Committee (COMSTAC) is an advisory board which provides information, advice, and recommendations to the Secretary of Transportation, through the FAA's Office of Commercial Space Transportation (FAA/AST) on all matters relating to U.S. commercial space transportation industry activities. The committee provides a forum for the development, consideration, and communication of information from a knowledgeable, independent perspective. These communications generally come in the form of observations, findings, and recommendations on topics assigned by AST and presented at the semi-annual public meetings.

## Introduction to FAA AST R&D

Congress appropriates funds to the Federal Aviation Administration (FAA)'s Office of Commercial Space Transportation (FAA/AST) for research, engineering and development.<sup>1</sup> Current funding is directed toward projects in the following broad research topic areas: Space Traffic Management and Spaceport Operations, Space Transportation Vehicles, Human Spaceflight, and Industry Innovation. FAA/AST also conducts near-term safety research and development (R&D) through contract acquisitions with specific milestones and deliverables. Longer-term safety research is conducted by FAA/AST through the Center of Excellence for Commercial Space Transportation (COE CST), funding research grants with member universities and other organizations e.g., affiliate members, associate members, and collaborators. The COE CST is scheduled to cease operation in August 2022, and a follow-on research acquisition structure is required to focus and coordinate longer-term commercial space safety research. AST has identified a candidate research consortium structure to fulfill this need.

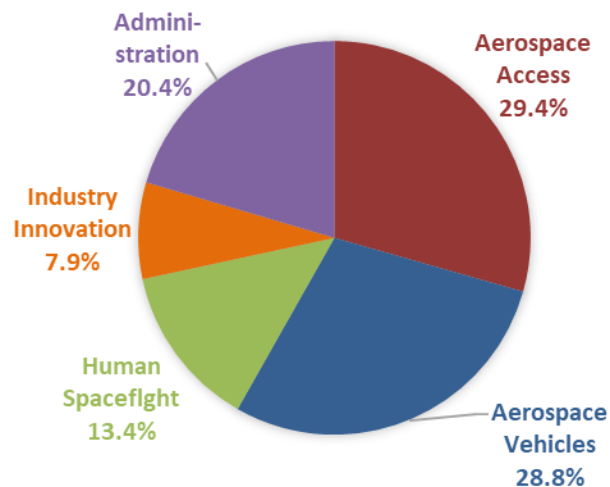
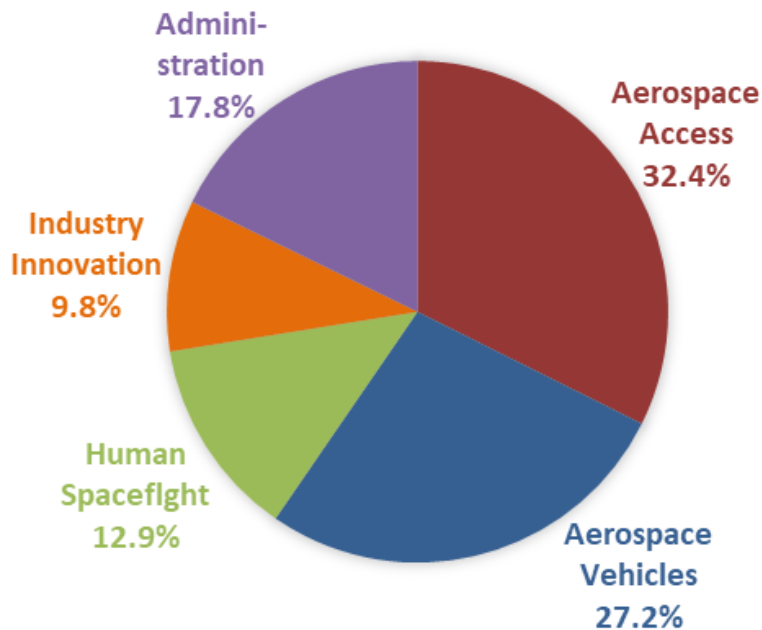


<sup>1</sup> A summary of AST's R&D grant program, the Center of Excellence for Commercial Space Transportation can be found here: [http://coecst.org/wp-content/uploads/2020/08/Yr9-Exec-Summary\\_REV1-C-small.pdf](http://coecst.org/wp-content/uploads/2020/08/Yr9-Exec-Summary_REV1-C-small.pdf) and the current research priorities and work plan, entitled the Commercial Space Transportation Research Road Map can be found here: <http://coe-cst.org/wp-content/uploads/2020/04/2015-12-15-Updated-Research-Roadmap-Report.pdf>

## AST Research Roadmap

Over the past 10 years, FAA AST conducted research activities using contracts and university grants through the COE CST. In 2011, a Stanford-led workshop, attended by government, academic, and industry representatives, produced a report entitled the “FAA COE CST Research Roadmap Report.” This report included a comprehensive framework of possible research topics, referred to as research areas (RA). Virtual workshops held in 2014-2015 updated the report, now entitled “Commercial Space Transportation Research Roadmap,” and updated the framework with minor revisions. The graph below shows the distribution of \$16.3M across all research funding (contract and university grants) in all RAs, including administration, since 2010.

Since 2015, FAA AST spent \$10.3M in research funding, with approximately the same distribution of funds across RA (figure below).



## FURTHER HISTORICAL STATUS

Since its establishment by an act of Congress (51 USC Ch. 509) in 1984, the FAA Office of Commercial Space Transportation (FAA/AST) has been mandated:

*to promote economic growth and entrepreneurial activity through use of the space environment for peaceful purposes - §50901(b)1*

And specifically:

*to encourage the United States private sector to provide launch vehicles, reentry vehicles, and associated services by . . . facilitating and encouraging the use of Government-developed space technology and promoting the continuous improvement of the safety of launch vehicles designed to carry humans, including through the issuance of regulations, to the extent permitted by this chapter - §50901(b)2*

In 1996, the National and Commercial Space Programs – Programs Targeting Commercial Opportunities General authority legislation states:

*take actions to facilitate private sector involvement in commercial space transportation activity, and to promote public-private partnerships involving the United States Government, State governments, and the private sector to build, expand, modernize, or operate a space launch and reentry infrastructure. - §50903(b)2*

The specific implementation of this “encourage, facilitate and promote” framework has been to a great extent left in the hands of the agency and the office. To date, the most notable effort of AST in this regard has been the establishment and support of the COE CST at several U.S. universities. Centers of Excellence are authorized as an FAA grant program by Congress in 1990. – Public Law 101-508, sec. 9209. §44513(a). The COE CST program is currently set to retire in August of 2022.

The COE CST program has been notably engaged in supporting the publication of research papers, including affiliation with the *New Space Journal*, a peer reviewed publication broadly focused on commercial space related research. COE CST also hosted a number of workshops that have engaged industry representatives with the academic researchers supported by the program.

## COMSTAC EVALUATION INDUSTRY INPUT ON AST’S R&D CONSORTIUM

For its spring 2021 meeting, the COMSTAC’s Innovation and Infrastructure Working Group (I&I WG) was tasked to examine AST’s plan to establish a new research consortium to replace the COE CST. AST also requested that the COMSTAC provide industry input to identify awareness, strengths and weaknesses of AST’s current research consortium concept, and to identify additional potential alternatives and options.

## OBSERVATION: PROPOSED NEW DIRECTION

FAA proposed establishment of a new Commercial Space Innovation Institute (CSII) as a replacement to the COE CST program. The CSII model is based on other successful governmental programs such as NASA's Advanced General Aviation Transport Experiments (AGATE) program, DoE's Industry of the Future program and the DoD's Space Enterprise Consortium (SpEC). According to preliminary FAA documents the goals of the CSII will be:

1. Maximizing industry-university collaboration, and universities' awareness of industry needs
2. Encouraging collaborative research projects
3. Maximizing participation by industry, government agencies, FFRDCs, and other research organizations

CSII intends to ensure that research topics will align with industry interests by soliciting input from the COMSTAC as well as directly from industry via "open calls." Funding levels will be higher than under COE CST, at \$1.5-\$3 million per task.

CSII intends to utilize FAA's Other Transaction Authority (OTA or OT) granted to the agency in 1996 under 49 USC 106(l)(6). Use of OTAs will enable program managers to eschew many bureaucratic hurdles and maximize flexibility and responsiveness. An OTA is specifically prescribed as the mechanism for the awarding of the Consortium Manager Award to a qualified entity.

The original CSII proposal calls for minor (\$5,000 per entity) contributions to defer processing costs and ensure buy-in of participating organizations.

## OBSERVATION: SURVEY RESULTS

COMSTAC conducted a survey of industry participants to assess the effectiveness of FAA R&D including the existing COE CST program and the proposed new direction with CSII.

Overall, most respondents, but not all, indicated a low-to-medium level of familiarity with *existing* AST R&D and COE efforts, with several respondents indicating that awareness of efforts is due to "piecemeal" participation in workshops and conferences by their individual employees, rather than top-down or whole-of-organization awareness and involvement. Two respondents indicated that AST's R&D budgets were too low-level to generate significant impact on or engagement with the commercial space transportation industry.

One member indicated that they believe there to be a "mismatch" between AST's chartered research efforts and the FAA's statutory authority, as well as a disconnect between "historical projects in the COE" and the research priorities of academia and industry.

Survey respondents offered little comment on the proposed new Commercial Space Innovation Institute (CSII), indicating more education on this topic is required.

## FINDINGS

While industry in general has yet to become fully informed on the details of the FAA's proposed new Commercial Space Innovation Institute (CSII) program, COMSTAC finds the proposal to be a constructive step. CSII addresses the primary concerns expressed by industry and revealed in our survey results. In particular, the more centralized CSII framework should be appropriate for addressing the concerns that existing AST R&D is fragmentary, of insufficient scale and mismatched. The conclusion is based on the observation that these outcomes are primarily driven by the budgetary and geographical divisions inherent in the previous, COE CST, model.

The CSII model, along with the R&D Topic Priorities, outlined elsewhere in this document and informed by COMSTAC, should serve to align the efforts of CSII appropriately with the academic and industry research objectives. The centralized CSII model should also make it easier to correct any perceived misalignments and adapt to changing priorities.

Given the need to move at the speed of industry, COMSTAC finds the use of OTAs as appropriate and important to this proposed program or any program intended to keep the U.S. in the lead for cutting edge space related R&D.

COMSTAC finds the choice to have a minimal fee associated with participation acceptable. This will ensure that participating organizations have bought into and will engage with the program.

COMSTAC finds the decision to model CSII along the lines of successful projects at NASA, DoE and DoD to be a positive choice.

COMSTAC notes that FAA AST Research has produced materials outlining the CSII approach and has made its leadership available to provide briefings as requested.

## RECOMMENDATIONS: CSII

COMSTAC supports the FAA's direction in reforming its R&D efforts. COMSTAC recommends that the FAA continue to develop the Commercial Space Innovation Institute (CSII) program and provide additional briefings and documents to industry. Industry, and COMSTAC members in particular, should avail themselves of these opportunities.