COSPAR

Panel on Establishing a Constellation of Small Satellites (PCSS)

15 April 2026

Chair:

- Dan Baker (USA), 2024 – 2028*

Vice-Chairs:

- Amal Chandran (USA), 2024 – 2028*

Members:

- Ayman Ahmed (Egypt), 2023 – 2027
- Loren Chang (Taiwan), 2020 – 2024
- Praveen Kumar Kuttanpillai (India), 2020 – 2024
- Malcolm MacDonald (UK), 2020 – 2024
- Mustapha Meftah (France), 2020 – 2024
- Robyn Millan (USA), 2020 – 2024
- Jong Uk Park (South Korean), 2020 – 2024
- Colin Price (Israel), 2020 – 2024
- Ji Wu (China), 2020 – 2024

Intercommission/Panel/Task Group Liaison:

- PRBEM: Yoshi Miyoshi (Japan), 2023 – 2027
- PMLDS: Amal Chandran (USA), 2025 – 2029

The Panel on establishing a Constellation of Small Spacecraft (PCSS) has the stated objective of studying the near-Earth space environment using instruments onboard small orbiting satellites. The initial focus of the previous Task Group on establishing a Constellation of Small Spacecraft (TGCSS) has been to address key issues in the domain of space weather, radiation belt research and Earth observation. Many of the small spacecraft presently in orbit making measurements relevant to TGCSS objectives have been adversely affected by the recent anti-satellite (ASAT) test that has created a debris cloud in low-Earth orbit (LEO). This cloud will undoubtedly remain in space for many years and will constitute a significant threat and obstacle to the ability of TGCSS to carry out its envisioned future research program. In a very real sense, the ASAT debris

cloud can be considered a form of “anthropogenic space weather”: A human-caused detrimental effect on the near-Earth space environment. We condemn this kind of event and we urge the nations of the world to avoid all such irresponsible actions and activities in the future.

Watch the video presenting the TGCSS at **https://www.youtube.com/watch?v=ww-7pmWGpjU**

Watch the video of the TGCSS Americas zone town hall webinar held on 2 September 2020 at **https://youtu.be/G0VBgGCaaKw**. Discussion begins at 2:50.

Watch the video of the TGCSS Asia/Oceania zone town hall webinar held on 29 September 2020 at **https://www.youtube.com/watch?v=AMEV25pxD7U**

Q&As from the Asia/Oceania zone town hall webinar.

The COSPAR Task Group on establishing a Constellation of Small Satellites (TGCSS) will hold three webinars to explore this concept. The American zone **webinar** will take place 2 September 2020 at 12:00 noon EDT. The European/Mid-East/Africa sector will follow about 2 weeks later and the Asia/Oceania sector is scheduled for 29 September 2020 at 15:30 (Beijing time, GMT+8). To anticipate attendance levels, we ask those wishing to join the American zone webinar to **register**. Those interested in the European/Mid-East/Africa webinar should express their interest by sending a message to **COSPAR** and for the Asia/Oceania webinar to **ISSI-BJ**.

Read the article **An International Constellation of Small Spacecraft**, appearing in the August 2020 issue of Space Research Today, number 208.

Terms of Reference

Background: The first COSPAR Strategic Action Plan (adopted in March 2019) recommends:

As a demonstration of COSPAR’s value to its Members, and its importance in space research, COSPAR should explore the possibility of assembling an international consortium that will develop, launch, and acquire data from a constellation of small satellites. As always with COSPAR activities, participation in the consortium would be voluntary. The small satellites with instruments would need to be provided by Member nations, and there will need to be a major space agency(s) that facilitates launches and data collection. It will be important that the constellation yields useful and important data, so that each contributing nation can state that it is assisting in the solution of an important scientific problem. A particularly useful constellation would be one that measures the plasma conditions in the ionosphere, with sufficient measurement density to substantially improve space weather forecasts.

Further, The COSPAR Scientific Roadmap: Small Satellites for Space Science recommends:

COSPAR should facilitate a process whereby International Teams can come together to define science goals and rules for a modular, international small satellite constellation. The role of COSPAR is one of an honest broker, coordinating not funding. The results of an international effort to build small satellite constellations would be valuable for all participants and would be more valuable than the individual parts. COSPAR is in a position to help foster this international collaboration, creating a precedent for setting up community science in a very open way.

Purpose: Accordingly, a Task Group is established for the purpose of developing an actionable plan for implementing the recommendations of the first COSPAR Strategic Action Plan (2019-2023) and the COSPAR Scientific Roadmap on Small Satellites for Space Science. Specifically, the Task Group will:

- Design, in reasonable detail, a constellation of small satellites that can measure the plasma conditions in the ionosphere, with sufficient measurement density to substantially improve space weather forecasts;
- Specify the measurements required and likely instruments that must be carried on each spacecraft;
- Specify the data rates and possible means for acquiring and analyzing the data, and making it available to improve space weather forecasts;
- Determine which national space programs, or organizations would be willing and able to contribute a capable small satellite to the constellation;
- Determine whether a major space agency or agencies would be willing and able to assist in the development, launch, and operations of the constellation;
- Specify the permanent organization structure that will coordinate the development and operations of the constellation.

Further, the Task Group should coordinate its activities with the INSPIRE program, which aims to provide a constellation of Earth and space weather-observing satellites by offering university and industry partners opportunities for cutting-edge research in science and engineering. INSPIRE is a consortium of global space universities formed to advance space science and engineering, and can be a source of small satellites for the constellation.

Membership: The Task Group is chaired by Daniel Baker, and the membership drawn from the international community committed to and knowledgeable on the use of small satellites for the purpose of both encouraging international cooperation and making a meaningful contribution to solutions of problems that are important to humanity. A list of members can be found **here**.

Reporting: The Task Group is expected to work expeditiously and report results and recommendations at the COSPAR Scientific Assemblies.

Expressions of Interest

Following the announcement of the launch of the TGCSS initiative, COSPAR has received several Expressions of Interest from its national member institutions and international scientific unions. The current list of these expressions of interest is posted below in the order received and will be updated as new responses are

forthcoming.

- International Union of Biological Science (IUBS)
- UK Space Agency (UKSA)
- Chinese National Committee for COSPAR (CNCOSPAR) and National Space Science Center (NSSC)
- Egypt's Academy of Scientific Research and Technology (ASRT) and National Committee for Astronomy and Space Sciences (NCASS)
- Czech Space Office (CSO)
- Korea's MIST and Space Weather Center (KSWC)
- Russia's Lomonosov Moscow State University
- Spain's Instituto de Astrofísica de Andalucía (IAA-CSIC), Instituto de Microelectrónica de Sevilla (IMSE-CNM-CSIC), and Aerospace Electronics Group (GranaSAT)
- Taiwan National SPace Organization (NSPO)
- Israel's Ariel University, Ben Gurion University, Tel Aviv University, and one industrial company (NSLcomm)
- India

Update

Read this **update on COSPAR-1**, also covering the motivation and background of the collaboration, the science objectives and payloads of the COSPAR-1 program, the motivation for having a COSPAR Center of Excellence for SmallSats, the status of the spacecraft development and what is needed to finish the spacecraft.

PCSS Sub-Group for Radiation Belt (PCSS SGRB)

Chair:

- Ji Wu (China), 2021 – 2025

Members:

- Ayman Ahmed (Egypt), 2023 – 2027
- Lei Dai (China), 2021 – 2025
- Mohammad Ebrahimi (APSCO), 2021 – 2025
- Maurizio Falanga (Switzerland), 2021 – 2025
- Vladimir Kalegaev (Russia), 2021 – 2025
- Wen Li (USA), 2021 – 2025
- Yoshizumi Miyoshi (Japan), 2021 – 2025
- Rumi Nakamura (Austria), 2021 – 2025
- Minna Palmroth (Finland), 2021 – 2025
- Anatoli Petrukovich (Russia), 2021 – 2025

Terms of Reference:

In accord with prior recommendations, a Task Group was established by COSPAR in late 2019 for the purpose of developing an actionable plan for implementing the recommendations of the first COSPAR Strategic Action Plan and the COSPAR Scientific Roadmap on Small Satellites for Space Science. The Task Group on Establishing a Constellation of Small Satellites (TGCSS), chaired by Daniel Baker, has had membership drawn from the international community committed to–and knowledgeable on–the use of small satellites.

The purpose of the TGCSS included both encouraging international cooperation and making a meaningful contribution to solutions of problems that are important to humanity. The subsequent work of TGCSS has emphasized the need to address several program elements, e.g. ionosphere/thermosphere, radiation belt, and also various more operational aspects such as ground station design, radio licensing, access to space, and data management and distribution.

In line with this need, it was decided to set up a sub-group of TGCSS dealing with radiation belt measurements. This Sub-Group on Radiation Belt (SGRB) will be chaired by Wu Ji, member of TGCSS, and will focus on the implementation of a constellation of small/cube satellites for radiation belt exploration. The constellation mission is expected to take a high time resolution survey of the Earth’s radiation belt with multiple satellites. The data set from such a mission shall be valuable for improving the model of the Earth’s radiation belts. SGRB will work at the system/organization level to gather international interests and resources along the whole process from the definition to the implementation of this constellation. SGRB will report to TGCSS and COSPAR on developments.

It is expected that synergy will be encouraged between TGCSS, SGRB and another COSPAR Task Group created in August 2021, the Task Group on Establishing an International Geospace Systems Program (TGIGSP). To this end, regular exchange and reporting between the groups and joint membership will be encouraged.