CGMS-53-NOAA-WP-04
25 March 2025

Prepared by: NOAA/NESDIS
Agenda Item 8.1
Discussed at WGI

Subject	**NOAA position paper for CGMS consideration:** **Antenna arraying techniques at NOAA**
In response to CGMS action/recommendation	n/a
HLPP reference	n/a
Executive Summary	The purpose of this working paper is to provide a high-level overview of NOAA/NESDIS related activities centered on the adoption and utilization of antenna arraying techniques. This position paper is submitted by NOAA/NESDIS ahead of the CGMS-53 working group and plenary sessions, with the objective to trigger reactions from CGMS members and to organize a discussion on this topic firstly in the CGMS-53 WGI meeting and secondly during the CGMS-53 plenary.
Action/Recommendation proposed	i) CGMS members are invited to provide verbal or written input on this theme to the CGMS-53 WGI session on 25 March 2025. ii) CGMS members are invited to prepare for a discussion on this theme at the CGMS-53 plenary in June 2025.

1 PURPOSE OF THIS PAPER

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2 TOPIC DESCRIPTION AND RATIONALE FOR CGMS ENGAGEMENT

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS), provides secure and timely access to global environmental data and information from satellites and other sources to promote and protect the nation's security, environment, economy, and quality of life.

The NESDIS mission entails ownership and operation of current LEO satellite missions (NOAA-20 and -21) as well the provision of operational coverage for multiple other US Government and International partnership missions to include (EPS-SG, Jason-3, Suomi NPP, DMSP, EWS-G, others). Future planning encompasses continued LEO operational support for current and anticipated follow-on NESDIS (NEON) and partnerships missions such as EPS-Sterna. The expectation is that support to a growing proliferated LEO (pLEO) environment will necessitate changes to ground system components to accommodate increasing support requirements in a cost efficient and low latency manner.

To the end, NOAA/NESDIS has been investigating advances in antenna arraying techniques to evaluate the value proposition and business case for adoption and utilization of antenna arrays. NESDIS has utilized expanded and non-traditional market research techniques to understand the development trajectory of current commercial industry capabilities for Electronically Scanned Arrays (Passive and Active), Digital Beam Forming and Hybrid Antenna Arrays.

NOAA/NESDIS conducted a Cooperative Research and Development Agreement (CRADA) with L3Harris in 2023 to perform an extensive demonstration of its Multi-Band Multi-Mission Digital Beamforming (DBF) Phased Array Antenna System (DPAAS). NESDIS has also completed commercial market research through multiple Broad Agency Announcements (BAAs) and Requests for Information (RFI). The composite of this research

has allowed NESDIS to evaluate and assess antenna arrays across multiple aspects to include:

- Cost benefit analysis
- Potential Adoption On-Ramp timelines
- Technology Readiness Level (TRL) for deployment
- Scalability to support future proliferated LEO operational coverage

NESDIS continues to monitor Antenna Arraying technology development with current market research efforts that may include additional CRADAs and/or demonstrations of hybrid phased arrays.

3 CONCLUSION

The advent of commercially developed cost high performance antenna arrays is an area of interest to NOAA/NESDIS as it seeks to continue it its provision of highly reliable LEO operational support to an expanding number of US and partner mission sets in a cost effective, low latency manner.