

MEMORANDUM OF AGREEMENT

BETWEEN

**THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
THE UNITED STATES AIR FORCE including the Space and Air Combat
Commands,**

THE UNITED STATES COAST GUARD

AND

**THE DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION**

**REGARDING THE DEVELOPMENT AND DEMONSTRATION OF THE
GLOBAL POSITIONING SYSTEM-BASED
DISTRESS ALERTING SATELLITE SYSTEM (DASS)**

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1.0 PURPOSE:

The purpose of this Memorandum of Agreement (MOA) is to set forth the roles and responsibilities of the United States Air Force through the Space and Air Combat Commands, the National Aeronautics and Space Administration (NASA), the Department of Energy (DOE) National Nuclear Security Administration (NNSA), the National Oceanic and Atmospheric Administration (NOAA), and the United States Coast Guard (USCG) in the development and Proof-of-Concept (POC) demonstration of a GPS-based Distress Alerting Satellite System (DASS) space segment, a prototype ground station, post-launch checkout, testing, and performance of a Demonstration and Evaluation (D&E) program. Specifically, this MOA establishes a technical and programmatic baseline for the implementation of the DASS through launch and checkout, and throughout the on-orbit life of the DASS POC satellite constellation.

2.0 BACKGROUND:

Satellite-aided Search and Rescue:

In the late 1970's, the NASA Search and Rescue (SAR) Mission office developed the technology used in the present international satellite-aided search and rescue system called Cospas-Sarsat. The Cospas-Sarsat acronym is a combination of the Russian "Cosmicheskaya Sistyema Poiska Avariynych Sudov" (translated "Space System for Search of Vessels in Distress), and the American "Search and Rescue Satellite Aided Tracking." The system consists of radio repeaters carried on the U.S. NOAA weather satellites (both low-earth polar orbiting and geostationary) and the Russian NADEZHDA navigation satellites. The satellite equipment relays distress transmissions from emergency beacons carried on airplanes, ships, and individuals to rescue authorities. Presently, there are five low-earth orbiting and two geostationary functioning satellites in the Cospas-Sarsat system. This system has promoted international goodwill by assisting in saving over 13,600 lives since its inception. The Mission Office has continued to conduct R&D to apply aerospace technology to meet search and rescue needs.

The National Search and Rescue Committee (NSARC) is a body of six government agencies (DOC, DOD, DOI, DOT, FCC, and NASA) which have a role in civilian search and rescue operations or actively invest in search and rescue technology development. NASA is both a founding member of NSARC and a signatory of the National Search and Rescue Plan, which defines agency search and rescue responsibilities. The Plan states that NASA is responsible for technology development. Once a given technology is developed and tested, it is further developed into an operational system by funding provided by an agency other than NASA.

Concept for Improved Satellite-aided Search and Rescue:

The NSARC Management has directed the NSARC R&D Working Group (chaired by NASA) to investigate the application of modern technology to improve satellite-aided Search and Rescue as a high priority. The current system, based on 1970's technology, has limitations. The Working Group is investigating a demonstration system as a first step to developing a state-of-the-art satellite-aided search and rescue system to augment the existing Cospas-Sarsat system. Studies have shown the best performance would be obtained using satellites in Mid-Earth Orbits (MEO). An opportunity has been identified by the Working Group to develop and deploy a MEO Search and Rescue system on the GPS

constellation in the form of “bent-pipe” repeaters compatible with existing 406 MHz search and rescue beacons. A POC repeater function is provided by slightly modified DOE equipment already existing on the GPS satellites allowing a very significant cost saving. DASS is a national program that will use GPS satellites to relay distress signals from maritime, aviation, and land-based beacons and will use a number of ground stations to process, locate, and distribute information concerning those signals. DASS will provide significantly improved emergency response.

This MOA addresses development of a DASS POC space segment as well as prototype ground equipment to perform post-launch checkout, testing, and performance of a demonstration and evaluation program, and planning the implementation of an operational DASS. The Parties envision that upon successfully completing the demonstration and evaluation, confirming the operational effectiveness, and implementing an operational configuration, DASS can be brought to an operational capability in the future. This future effort will be funded by agencies responsible for Search and Rescue operations, not NASA.

3.0 AUTHORITY:

The U. S. Air Force’s authority to enter into this Agreement is found in DoD Instruction 4000.19, Interservice and Intragovernmental Support, 9 Aug 95

NASA’s authority to enter into this Agreement is found in Section 203c of the National Aeronautics and Space Act of 1958, as amended, and 42 U.S.C. 2473c (5) and (6).

DOE’s authority to enter into this Agreement is found in 42 U.S.C. Sections 2051, 2052, 2053, and 7256, and 50 U.S.C. Sections 2463 and 2464.

NOAA’s authority to enter into this Agreement is provided by 15 U.S.C. 313 and 49 U.S.C. 44720.

U.S. Coast Guard’s authority to enter into this Agreement is found in 14 U.S.C. 2 and 141.

4.0 REFERENCE DOCUMENTS:

The following are informational documents describing the DASS and Cospas-Sarsat System requirements and supporting Search and Rescue work by the signing agencies. Assistance in obtaining copies of these documents can be provided by the NASA Search and Rescue Mission Manager by phone: 301-286-9839 or e-mail: david.w.affens@nasa.gov.

- National Search and Rescue Plan
- Interagency Cospas-Sarsat Program Agreement.
- Sandia Feasibility Study
- Cospas-Sarsat Technical documents

5.0 JOINT RESPONSIBILITIES:

All parties to this agreement shall annually assess the progress of the DASS effort.

DASS Management Working Group:

The DASS Management Working Group will be chaired by NASA. Members will include NASA's Search and Rescue Mission Office, NOAA's SARSAT Program, the U.S. Coast Guard's Office of Search and Rescue, the U.S. Air Force Rescue Coordination Center, Sandia National Laboratories Monitoring Systems and Technology Center, and the USAF's HQ AFSPC and SMC/CZ. The DASS Management Working Group will coordinate inter-department DASS planning and direction efforts. It will periodically meet to coordinate requirements and associated goals, long-range R&D planning, master acquisition strategies and supporting financial plans. The group will be supported as needed by users, operators, and technical advisors.

Meetings and technical reviews concerning DASS designs and performance capabilities will be held as needed. Appropriate technical working groups will be chartered to provide technical interchange between all government participants in DASS development, integration, maintenance, operation, and information reporting. Working groups will be empowered to address and resolve coordination issues as they may arise.

The DASS POC D&E shall be accomplished on a non-interference basis with GPS and NDS system operations and any testing needs will be coordinated through Headquarters Air Force Space Command/DOT per AFSPC Operating Instructions. This proof-of-concept system is not intended to be used as the operational system because the downlink frequency (S3) of 2226.48 MHz used by the GPS/NDS is for US Government use and not set aside for civil Search and Rescue (SAR).

6.0 AGENCY RESPONSIBILITIES:

6.1 NASA shall:

- A. Define DASS system performance requirements for the space and ground segments.
- B. In coordination with the Parties, develop and maintain the DASS Program Plan including development and coordination of the budget.
- C. Define and carryout testing during the Proof-of-Concept Phase.
- D. Design, procure, and operate the ground station for the Proof-of-Concept phase of the DASS Program.
- E. Define jointly with DOE, and support the DOE/NASA Statement of Work (SOW) for DASS POC implementation within existing DOE-supplied space equipment.
- F. Produce a final report at the termination of the Proof-of-Concept.

Original version of the DASS POC MOA: Effectivity Date (of last signature) is February 2, 2003.

- G. Provide the funding for the POC up to the D&E. Cost of the D&E shall be shared among the contributing operational agencies.

6.2 USAF Space Command (GPS JPO) shall:

- A. Support definition of system performance requirements for the space segment.
- B. Be responsible for DASS space system components spectrum coordination.
- C. Provide final approval for the addition of the DASS payload onto the GPS Satellites.
- D. Support integration of the USNDS payload with its embedded DASS functions onto the GPS satellite.
- E. Support early-orbit testing of the DASS functions as part of the currently planned USNDS payload support.
- F. Support on-orbit operations and maintenance as part of the currently planned USNDS support.
- G. Consider the interests and requirements of the operational Cospas-Sarsat System in decisions affecting the DASS POC.

6.3 DOE shall:

- A. Define jointly with NASA, and implement the DOE/NASA Statement of Work (SOW) for POC DASS implementation within existing DOE-supplied space equipment.
- B. Provide for the design, construction, payload-level integration and test of the DASS POC hardware to be flown on GPS satellites
- C. Design, develop, integrate, and test ground equipment to support early-orbit tests and orbital maintenance functions.
- D. Perform early-orbit-tests and monitor state-of-health of orbiting DASS POC payloads.
- E. Lead DASS-related interactions with the JPO regarding DOE NNSA GFE payloads.
- F. Make the changes defined in the Sandia Feasibility Study in the DOE NNSA GFE payloads necessary to implement DASS POC.

6.4 NOAA shall:

- A. Support definition of system performance requirements for the space and ground segments
- B. Assist in planning for the integration of an operational DASS system.

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- C. Support DASS tests and demonstrations through the U.S. Cospas-Sarsat ground segment.
- D. Work with the Parties and the appropriate national and international spectrum management organizations in coordinating frequency allocations.
- E. Coordinate DASS activity and positions with the International Cospas-Sarsat Program.
- F. Exchange satellite-aided search and rescue technical information and data with the Parties.
- G. For D&E provide DASS alerts to the appropriate USAF and USCG rescue authorities via the SARSAT communication network

6.5 USCG shall:

- A. Assist in developing search and rescue operational requirements.
- B. Participate as appropriate in DASS exercises and demonstrations.
- C. Evaluate DASS effectiveness and report findings to the Parties.

6.6 USAF Air Combat Command (AFRCC) shall:

- A. Assist in developing search and rescue operational requirements.
- B. Participate as appropriate in DASS exercises and demonstrations.
- C. Evaluate DASS effectiveness and report findings to the Parties.

7.0 FUNDING RESPONSIBILITIES:

All activities under or pursuant to this MOA are subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341. This MOA is not a funding document, and does not represent the obligation or transfer of funds.

NASA shall budget for funding to the DOE for the DASS POC up to the D&E as follows: FY02 - \$3.2M, FY03 - \$3.0M, and FY04 - \$3.0M. Each agency shall fund its own participation in the D&E and the definition of operational requirements. However, there is no intent that USAF Space Command (GPS JPO) or DOE NNSA bear additional costs as a result of conducting the DASS POC development or the D&E.

8.0 DURATION, AMENDMENT OF AGREEMENT, AND TERMINATION:

This Agreement shall remain in force for five years when it will be reviewed for updating and renewal.

This MOA may be amended by mutual agreement of the all of the parties. Amendments must be in writing, and signed by the authorized representatives of all parties.

This Agreement will be reviewed formally at the request of any party. This Agreement may be amended or terminated by written agreement of the parties. Any party may unilaterally terminate this Agreement upon 6 months notice to the other parties.

9.0 RESOLUTION OF ISSUES CONCERNING AGREEMENT:

Nothing herein is intended to conflict with current USAF, DOE, NOAA, USCG or NASA directives. If the terms of this Agreement are inconsistent with existing directives of any of the agencies entering into this Agreement, then those portions of this Agreement which are determined to be inconsistent shall be invalid; but the remaining terms and conditions not affected by the inconsistency shall remain in full force and effect.

Should disagreement arise on the interpretation of the provisions of this Agreement, or amendments and/or revisions thereto, that cannot be resolved at the operating level, the area(s) of disagreement shall be stated in writing by each party and presented to the other parties for consideration. If agreement on interpretation is not reached within thirty days, the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution.

10.0 EFFECTIVE DATE:

This MOA is effective when signed and dated by all parties.

11.0 CONFIRMING SIGNATURES:

For NASA:

Robert E. Spearing

Robert E. Spearing
Assistant Associate Administrator
(Space Communications)
Office of Space Flight

Date: 10/15/02

For DOE NNSA:

Kenneth E. Baker

Kenneth E. Baker
Principal Assistant Deputy Administrator
Defense Nuclear Nonproliferation

Date: 19 Dec 2002

For USAF Space Command:

Howard J. Mitchell

Howard J. Mitchell
Major General, USAF
AFSPC/DO

Date: 6 Nov 2002

For Space and Missile Systems Center

Brian A. Arnold

Brian A. Arnold
Lt. General, USAF
SMC/CC

Date: 17 Nov 02

For NOAA:

Gregory W. Withee

Gregory W. Withee
Assistant Administrator for Satellite and
Information Services

Date: 11/27/02

For USAF Air Combat Command

Anthony F. Przybyslawski

Anthony F. Przybyslawski
Brigadier General, USAF
Assistant Director of Aerospace Operations

Date: 26 SEPO 2

For United States Coast Guard:

Harvey E. Johnson

Harvey E. Johnson
Rear Admiral
Director of Operations Policy

Date: 24503