esa european space agency

esoc (european space operations centre)

Memorandum ref.. MOD/MAS/WF ND/7222 Darmstadt 14 April 1997

From : W Flury

To : IADC Contact Points
WG Chairs and Deputy

cc :

Subject: IADC Terms of Reference

Dear Colleague,

Please find enclosed the updated Terms of Reference of IADC for your review.

Please let me know until May 16, 1997 of any corrections or changes still needed.

The signature sheet will be completed at the next Steering Group meeting, Oct. 7, 1997, at IAF Torino.

Yours sincerely,

W. Flury

W. Flury

TERMS OF REFERENCE FOR THE

INTER-AGENCY
SPACE DEBRIS COORDINATION COMMITTEE
(IADC)

Status: March 21, 1997

D. Leadbeater BNSC	Y. Trempat CNES	Y. L. Qi CNSA
D. Alwes DARA	W. Flury ESA	M. G. Chandrasekhar ISRO
S. Toda Japan	G. Levin NASA	V. Blagun RKA

CHANGE RECORD

July 10, 1996	New members BNSC, CNES, ISRO
Sept. 12, 1996	Change in WG membership, Annex V
March 21, 1997	DARA new member. Steering Group meeting

Terms of Reference for the Inter-Agency Space Debris Coordination Committee

This document constitutes the Terms of Reference (ToR) for the Inter-Agency Space Debris Coordination Committee (IADC)and establishes the basic principles related to its function.

The Terms of Reference of the Inter-Agency Space Debris Coordination Committee have been agreed at the 10th-IADC meeting at TSNIIMASH, Kaliningrad, October 25-26, 1993, and have been updated at the 12-th IADC meeting at NASA Johnson Space Center, Houston, March 8-10, 1995, at the 13th-IADC meeting at ESOC, Darmstadt, February 27 - March 1, 1996, and at the 14-th IADC meeting at ESOC, Darmstadt, March 20-21, 1997.

1.Purpose

The primary purpose of the IADC is to exchange information on space debris research activities between member space agencies, to facilitate opportunities for cooperation in space debris research, to review the progress of ongoing cooperative activities and to identify debris mitigation options.

2.Rationale

The members share a number of common interests in space debris research which may be developed into a variety of cooperative research activities. Such ventures are likely to increase in frequency and scope in the future. It is highly desirable to exchange information on current research activities so as to identify future cooperative activities. Therefore, the IADC is established to identify, plan, and assist in the implementation of joint cooperative activities that are of mutual interest and benefit.

3.Scope

The IADC will

a. review all ongoing cooperative space debris research activities between member organizations;

b. recommend new opportunities for cooperation;

c. serve as the primary means for exchanging information and plans concerning orbital debris research activities;

d. identify and evaluate options for debris mitigation.

Any specific cooperative activities endorsed by the IADC will be implemented through arrangements negotiated between member organizations.

Members should exchange data resulting from national orbital debris programs as appropriate. Data and information exchanged through the IADC will normally be exchanged without restrictions as to use or disclosure. In the event that technical data is exchanged which is considered to be proprietary, and for which protection is desired, the data shall be marked with a notice indicating the use and disclosure restrictions, and the recipient agrees to abide by the terms of such notices.

4.Membership

Members of the IADC are the British National Space Centre (BNSC), the Centre National d'Etudes Spatiales (CNES), China National Space Administration (CNSA), Deutsche Agentur für Raumfahrt-angelegenheiten (DARA), the European Space Agency (ESA), the Indian Space Research Organisation (ISRO), Japan, the National Aeronautics and Space Administration (NASA) and the Russian Space Agency (RKA).

New members may be included upon unanimous decision of the members of IADC.

Member delegations may include representation from other organizations or government agencies in their delegation.

More detailed criteria for membership are defined in Annex I.

5.Organizational structure

The IADC will comprise

- a Steering Group composed of representatives of the members. The Steering Group will include the points of contacts of the members listed in Annex II.

- four specialised Working Groups:

  Working Group 1: Measurements

  Working Group 2: Environment and Data Base

  Working Group 3: Protection

  Working Group 4: Mitigation.

Each Working Group shall be composed of 2-3 experts from each member. The terms of reference of each working group are given herein and as supplemented in Annex III. Present working group chairperson, deputy chairperson, and membership are listed in Annexes IV and V.

Each member of IADC must be represented in the Steering Group and in Working Group 4. Representation in the other Working Groups is desirable but not mandatory.

6.Meetings

Location of meetings of the IADC will rotate among the members of the IADC, as appropriate. The frequency and schedule of IADC meetings will be established by the Steering Group. Meetings at intervals of about 8-10 months should be aimed for, preferably coinciding with other international meetings.

The host of each meeting will act as the chair of the meeting, and any preceeding Steering Group meetings. The host will be responsible for coordinating the dates, location, and agenda of the meetings and drafting and distributing the minutes of these meetings.

General meeting arrangements and associated meeting expenses will be borne by the host agency. Each member will be responsible for the travel and subsistence of its representatives attending the IADC.

7.Terms and Conditions

These Terms of Reference may be modified or terminated by mutual agreement of the parties. These Terms of Reference and all activities under these Terms of Reference may be terminated unilaterally by any member with three-months prior written notice. All debris cooperative activities for which separate agreements have been concluded, may continue after termination of these Terms of Reference, pursuant to the terms and conditions of those agreements.

These Terms of Reference document the mutual interest on the part of the members of IADC to exchange information on orbital debris. The Terms of Reference do not establish any obligation or legal requirement to do so, nor do they establish any obligation to conduct any particular cooperative activity.

Working Group 1

Measurements

Terms of reference

- The IADC Steering Group has established Working Group 1 on Measurements
- The members of WG 1 are appointed by each member of the IADC.
- The Working Group nominates a chairperson and a deputy. The chairperson organizes and guides the activities of the Working Group.
- The Working Group establishes its own agenda. However, it may also receive tasks from the IADC.
- The Working Group reports through its chairperson to the IADC Steering Group.
- Meetings of the Working Group can be attended by others when invited by a member of the IADC.

Scope and objectives

The scope of WG 1 are all measurement techniques, both functioning and currently under development, to gain information on man-made and natural objects in near-Earth space. This includes

- ground-based and space-based measurements and related techniques, e.g. radar, optical and infrared
- detectors and collectors for small-size particulates onboard space vehicles
- analysis of spacecraft surfaces exposed to the space environment.

Within the above scope the objectives of the WG are to

- review space debris research efforts in the area of measurement techniques
- identify, evaluate and recommend new opportunities for cooperation
- serve as means for exchanging information and plans concerning research activities in the area of measurements of orbital debris.

Required inputs

- Reports on research activities in member organizations with regard to measurements.

Expected outputs

- Identification, definition and review of cooperative research activities.

Working Group 2

Environment and Data Base

Terms of reference

- The IADC Steering Group has established Working Group 2 on Environment and Data Base.
- The members of WG 2 are appointed by each member of the IADC.
- The Working Group nominates a chairperson and a deputy. The chairperson organizes and guides the activities of the Working Group.
- The Working Group establishes its own agenda. However, it may also receive tasks from the IADC.
- The Working Group reports through its chairperson to the IADC Steering Group.
- Meetings of the Working Group can be attended by others when invited by a member of the IADC.

Scope and objectives

The scope of Working Group 2 is the characterization and modelling of meteoroid and debris around the Earth and storage and access of the data by electronic means. This includes

- meteoroid and debris models describing the spatial distribution and other characteristics, e.g. flux, size, albedo.
- short- and long-term evolution
- related mathematical methods
- collision prediction and risk assessment
- uncontrolled reentry
- establishment of joint data base for debris and meteoroids
- development of models which characterize explosions or collisions in space.

Within the above scope the objectives of the WG are to

- review research efforts in environment modelling and related data base
- identify, evaluate and recommend new opportunities for cooperation
- serve as means for exchanging information and plans concerning research activities in the area of environment modelling and related data base.

Required inputs

- Reports on research activities in member organizations with regard to environment modelling and related data bases.

Expected outputs

- Identification, definition and review of cooperative research activities.
- Concepts for extended and comprehensive data bases.

Working Group 3

Protection

Terms of reference

- The IADC Steering Group has established Working Group 3 on Protection.
- The members of WG 3 are appointed by each member of the IADC.
- The Working Group nominates a chairperson and a deputy. The chairperson organizes and guides the activities of the Working Group.
- The Working Group establishes its own agenda. However, it may also receive tasks from the IADC.
- The Working Group reports through its chairperson to the IADC Steering Group.
- Meetings of the Working Group can be attended by others when invited by a member of the IADC.

Scope and objectives

The scope of the activities of WG 3 comprises design and technology of shielding against meteoroids and space debris and the associated test methods.

Within the above scope the objectives of the WG are to:

- establish a common data base of world-wide test facilities
- optimize the shield design, its performance and test methods, including the use of computer codes
- coordinate test procedures for computer code validation
- establish a data base on impact test results
- develop and update shield design and test planning for improvement of crew safety and satellite/station system integrity
- study space vehicle fragmentation events including dynamics of structure at their impact with space debris and secondary debris
- coordinate test procedures for impact testing on pressurized structures
- study the feasibility of common shield designs, testing planning and test procedures
- review research efforts on hypervelocity testing and shielding
- identify, evaluate and recommend new opportunities for cooperation
- serve as means for exchanging information concerning actual on-orbit impacts and shielding design performance
- serve as means for exchanging information and plans concerning research activities in the area of protection.

Required inputs

The working group requires the following inputs:

- Design and performance data on current shield concepts.
- Description and capabilities of test methods.
- Description and capabilities of computer codes.
- Information on planned activities in the area of shield design, shield testing and establishing and upgrading of test facilities.

Expected outputs

The expected outputs are as follows:

- Data base on testing and shielding.
- Detailed acquaintance with existing shield design, performance and test facilities.
- Proposed shield design and test activities for improvement of crew safety and satellite/station system integrity.
- Proposal for implementing the proposed concepts.

Working Group 4

Mitigation

Terms of Reference

- The IADC Steering Group has established Working Group 4 on Mitigation.
- The members of WG 4 are appointed by each member of the IADC.
- The Working Group nominates a chairperson and a deputy. The chairperson organizes and guides the activities of the Working Group.
- The Working Group establishes its own agenda. However, it may also receive tasks from the IADC.
- The Working Group reports through its chairperson to the IADC Steering Group.
- Meetings of the Working Group can be attended by others when invited by a member of the IADC.

Scope and objectives

The scope of Working Group 4 is the study of all measures to reduce or avoid the creation of space debris or reduce the hazards created by space debris. This includes

- identification of space debris sources
- design and operations of space system to avoid or reduce the creation of space debris
- removal of man-made objects
- measures to prevent the creation of space debris
- measures to reduce the collision hazard
- guidelines for debris mitigation.

Within the above scope the objectives of the WG are to

- review space debris research efforts in the area of mitigation
- identify, evaluate and recommend new opportunities for cooperation
- serve as means for exchanging information and plans concerning research activities in the area of mitigation.

Required inputs

- Debris mitigation measures of member organizations.

Expected outputs

- Evaluation of debris mitigation measures.
- Handbook/guidelines for debris mitigation.

Annex I

Criteria for Membership in IADC

1. Scope

The purpose of the "Criteria for Membership in IADC" is to expand on Article 4 of the ToR of IADC, and to provide a more detailed and precise description of the criteria for membership in IADC.

Membership in IADC is addressed in Article 4 of the ToR.

2. Preamble

In the interest of efficiency the number of members of the IADC should be of a manageable size and, therefore, limited to appropriate nations and organizations consistent with the aims and objectives agreed in the ToR of the IADC. Where appropriate greater concentration in regional grouping should be aimed for.

IADC members complete necessary coordination (Intra-agency, Inter-agency, etc.) prior to IADC meetings.

3. Criteria for membership

a. Members are countries or national or international space organisations which are carrying out space activities, through either manufacturing, launching and operating spacecraft or manufacturing and launching rockets.

   A member should be actively undertaking space debris research activities and contribute to an increased understanding of space debris issues.

   A member may represent one or several countries.

b. A country is represented in IADC by itself or by one space organization. The delegation of any IADC member may, however, be comprised of delegates from other space organizations or other selected agencies of that country or of other countries.

c. International consortia sponsoring major satellite programmes (e.g. INTELSAT, INMARSAT, etc.) or relevant specialized agencies of the UN (e.g. International Telecommunication Union) may be invited to participate in IADC meetings when specific issues of interest are discussed.

ANNEX II

Contact Points of IADC Members

Status: March 21, 1997

BNSC: Mr R. J. Tremayne-Smith, British National Space Centre, 151 Buckingham Palace Road, London SW1W 9SS, ENGLAND

Tel: +44 171 215 0821
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Richard_Tremayne-Smith@bnsc-hq.ccmail.compuserve.com

CNES: Mr Y. Trempat, CNES, 18 Avenue E. Belin, 31055 Toulouse Cedex, FRANCE

Tel: +33 5 61 27 31 25
Fax: +33 5 61 28 29 10

CNSA: Prof Y. Qi, China National Space Administration, P.O.Box 849, Beijing, CHINA 100830

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Fax: +86 10 6837 0080

DARA: Mr D. Alwes, DARA, POB 30 03 64, D-53183 Bonn, GERMANY

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Fax: +49 228 447 718
Detlef-alwes@dara.de

ESA: Prof. W. Flury, ESOC, Robert-Bosch-Str. 5, 64293 Darmstadt GERMANY

Tel: +49 6151 902 270
Fax: +49 6151 902 625
wflury@esoc.esa.de

ISRO: Mr. J. Ninan, EOS, ISRO Headquarters, New Bel Road, Bangalore - 560 094, INDIA

Tel: +91 80 333 4361
Fax: +91 80 341 2823

Japan: Dr. S. Toda, NAL, 7-44-1 Jindaiji-Higashi-machi, Chofu, Tokyo, 182 JAPAN

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NASA: Mr. G. Levin, NASA HQ, Office of Space Flight, Code MP, Washington D.C. 20546, USA

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george.levin@hq.nasa.gov

RKA: Dr. S. Kulik, RKA HQ, Schepkina Str. 42, Moscow 129 857, RUSSIA

Tel: +7 095 971 8284
Fax: +7 095 288 9063
+7 095 975 4467
sergey.kulik@khsc.nasa.ru

Annex III

Format of the IADC Meetings and Procedures for the Working Groups

A Format of IADC Meetings

1. The host agency or country will act as secretary and prepare the minutes of the meeting for the approval of the Chair.

2. The agenda will be prepared by the Chair and provided to all the participants not less than three weeks prior to the meeting. The agenda will identify topics and speakers and time allocations for presentation. Not less than one third of the time should be allocated to discussion and plans.

3. The Chair will be responsible for reporting the groups activity to the plenary session; he may ask members of the group to make parts of the report.

4. The general plan for future meetings should be for maximum four full days. The pattern of such a meeting would be:

   Day 1 AM Plenar
   PM Working Groups

   Day 2 AM Working Groups
   PM Working Groups

   Day 3 AM Working Groups
   PM Working Groups

   Day 4 AM Plenary - Working Groups Report
   Executive session of Plenary:
   - o Draft minutes with summary
   - o Recommendations
   - o List of action items

   PM - Review of proposals of cooperative projects between Steering Group and Working Groups
   - Tours of suitable facilities
   - Closing session.

The objective is to provide enough time for meaningful discussion and the accomplishment of real work.

5. Establish a "rule" that all presentations have word charts and figures, as appropriate to summarize the remarks. In addition the speaker should provide three copies to the secretary.

B Procedures for the Working Groups

1. Elect a Chairperson to serve a term of two consecutive meetings and a Deputy who will succeed as Chairperson for the following term. A new Deputy will be elected for the following term, etc.

2. Normally a presentation should not last more than 15 minutes

3. Discussion should define the most immediately important topics for the Working Group and who will prepare material for the next meeting to address those topics. Assign the appropriate actions to make the presentations for the next meeting.

4. The Working Groups are expected to pursue agreed upon activities by fax, e-mail and other correspondence and communication between meetings to perform agreed upon tasks.

5. Working Groups are not expected to have meetings outside of the context of the general meeting. The objective of the plan is to reduce the total number of meetings.

6. The basic function of each Working Group is to define mutually agreed upon work so that each participant can better understand the issues and the state of understanding so as to advise his authorities as to appropriate policy and action.

Annex IV

Chairpersons and Deputies of Working Groups
Status: March 21,1997

	Chairperson	Deputy
WG1 Measurement	Andrey I. Nazarenko Center for Program Studies 84/32 Profsoyuznaya ul. Moscow 117810, Russia Tel +7 095 429 5400 Fax +7 095 420 2275 nazarenko@iki.rssi.ru	Dieter Mehrholz FGAN Neuenahrer Str. 20 D-53343 Wachtberg Germany Tel: +49 228 94 35 200 Fax: +49 228 34 09 51 Dieter_Mehrholz@fgan.de
WG2 Environment & Database	Robert C. Reynolds Lockheed Martin Engineering & Science Services 2400 NASA Road 1 C102, Houston TX 77085-3799 USA Tel +1 281 333 7071 Fax +1 281 333 7791 bobr@sn.dnet.nasa.gov	Fernand Alby CNES 18, Avenue E. Belin 31055 Toulouse France Tel: +33 5 61 28 14 64 Fax: +33 5 61 27 35 40 alby@cnes.fr
WG3 Protection	Seishiro Kibe National Aerospace Laboratory (NAL) 7-44-1 Jindaijihigashi-machi Chofu-shi Tokyo 182 Japan Tel: +81 422 70 7405 Fax: +81 422 70 7406 kibe@nal.go.jp	Sergei A. Meshcheryakov TSNIIMASH 4, Pionerskaya st. 141070 Kaliningrad Moscow region, Russia Tel +7 095 513 5796 Fax +7 095 274 0025
WG4 Mitigation	Walter G. Naumann ESA HQ 8-10, rue Mario-Nikis 75738 Paris Cedex 15 France Tel +33 1 5369 7350 Fax +33 1 5369 7678 wnaumann@esahq.esa.fr	David Spencer USAF Phillips Laboratory 3550 Aberdeen Ave SE Kirtland AFB, NM 87117-5776 USA Tel: +1 505 846 7994 Fax: +1 505 846 6053 spencer@plk.af.mil

Table 1. Chairpersons and Deputies of Working Groups

Annex V

Membership in Working Groups of the IADC

Status: March 21, 1997

	WG 1 Measurements	WG 2 Environment & Database	WG 3 Protection	WG 4 Mitigation
BNSC		Walker	Stokes	Crowther Tremayne-Smith
CNES	Berthias Durin Velasco	Alby Velasco	Rolfo	Bonnal Alby
CNSA		Zhang Wen Xiang	Xi Ruqing	Yang Jianmin
DARA				Alwes
ESA	Jehn Schwehm	Drolshagen Klinkrad	Lambert Heusmann	Soons Naumann Flury
ISRO		Ganeshan		Ganeshan
JAPAN	Arimoto (CRL) Takano (ISAS) Sato (Kyoto University)	Kibe (NAL) Kato (NASDA) Tajima (NASDA)	Katayama (CRC) Sato (NASDA)	Yasaka (Kyushu University) Takano (NASDA) Nakajima (ISAS)
NASA	Stansbery Vilas	Potter Johnson	Crews Christiansen	Loftus Levin
RKA	Kuriksha Yurasov Smirnov	Veniaminov Khutorovsky Potchukaev	Meshcheryakov Sokolov	Chekalin Yakovlev Michailov

Table 2. Composition of Working Groups