MARS SAMPLE HANDLING PROTOCOL WORKSHOP SERIES

WORKSHOP #2 TENTATIVE AGENDA

(10/16/00 DRAFT)

Day 1 (Wednesday, October 25th)

noon LUNCH (*Working Lunch for Sub-group Chairs - meet with Rummel et al.*)

1:00 p.m. Plenary – Intros and tutorials
- Mars program status
- Workshop #2 process (Organization and Objectives)
- Workshop #1 recap
- NRC life detection recap
- COMPLEX Mars sample return report (if available)
- Introduction to Strawman Protocol

3:30 Establish three Sub-groups to deal with key questions from framework:
- Life detection translation
- Biohazard testing group 1
- Biohazard testing group 2

6:30 WELCOME RECEPTION

Day 2 (Thursday, October 26th)

7:30 a.m. BREAKFAST

8:00 Day 1 Sub-groups caucus individually (until noon)

noon LUNCH

1:00 p.m. Plenary – Day 1 Sub-group reports (1/2 hour each)

2.30 Discussion of Day 1 Sub-group reports

5:30 Establish three new Sub-groups
- Physical and chemical test sequencing
- Molecular tests
- Organism-based tests (cellular & microbial; plant; animal)

6:00 ADJOURN

Day 3 (Friday, October 27th)

7:30 a.m. BREAKFAST

8:00 Day 2 Sub-groups caucus individually (until noon)

noon LUNCH

1:00 p.m. Plenary – Day 2 Sub-group reports (1/2 hour each)

2:30 Synthesis and discussion (assignment of final writing assignments)

5:00 ADJOURN

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WORKSHOP #2 CONFIRMED PARTICIPANTS (10/16/00)

PARTICIPANT	AFFILIATION	AREA(S) OF EXPERTISE	SUB-GROUP ASSIGNMENTS (Day 1; Day 2)
Acevedo, Sara E.	SETI Institute	(Planning Committee Member)	"Floater"
Allen, Carl	NASA Johnson Space Center	Sample handling and curation; physical/earth and planetary sciences	Biohazard Protocol (1); Physical and Chemical Tests (Co-chair)
Allton, Judith H.	NASA Johnson Space Center	Sample handling and curation; physical/earth and planetary sciences	Life Detection Protocol; Physical and Chemical Tests
Bada, Jeffrey	Scripps Institute of Oceanography, University of California, San Diego	Structure, stability, and evolution of proteins	Life Detection Protocol; Molecular Tests
Bielitzki, Joseph	NASA Ames Research Center	Chief NASA Veterinary Officer	Biohazard Protocol (2) Organismal/Cellular Tests
Bradley, John	MVA Associates, Norcross GA; Georgia Institute of Technology, Atlanta, GA	Electron Microscopy; Physical/Earth and Planetary Sciences	Life Detection Protocol; Physical and Chemical Tests
Candresse, Thierry	French National Institute of Agronomical Research (INRA)	Deputy Head of the Plant Health and Environment Department; Molecular-based detection and identification techniques for plant viruses and viroids	Biohazard Protocol (2) (Co-chair); Organismal/Cellular Tests
Crissman, Harry A.	Los Alamos National Lab	Flow cytology and cytochemical life detection methods; life detection	Life Detection Protocol Organismal/Cellular Tests
Daly, Michael J.	Department of Pathology, Uniformed Services University	Radiation resistant bacteria	Biohazard Protocol (1); Molecular Tests
DeVincenzi, Donald	NASA Ames Research Center	(Planning Committee Member)	Life Detection Protocol; Physical and Chemical Tests
Eisen, Johnathan	Institute for Genomic Research	Radiation resistance and DNA repair, microbial genomics and evolution, characterization of uncultured microbes	Biohazard Protocol (2); Molecular Tests
Fishbein, William N.	Dept. of Environment and Toxicologic Pathology, Armed Forces Institute of Pathology	Molecular toxicology; biochemical and molecular pathology; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (1); Organismal/Cellular Tests
Gabriel, Dean W.	Professor, Molecular Plant Pathology, University of Florida	Molecular plant pathology; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (2); Organismal/Cellular Tests
Giroir, Brett P.	Univ. of Texas Southwestern Medical Ctr	Endotoxins in pharmacological studies	Biohazard Protocol (1); Organismal/Cellular Tests
Grange, Jacques	Laboratoire de Haute Securite P4 Jean Merieux	Research Professor; Doctor Ingenior in Chemistry; Responsible of the MERIEUX Biosafety level 4 Facility; Thesis in virology; abilitations in biochemistry and in cancerology	Biohazard Protocol (1); Organismal/Cellular Tests
Gray, Greg	Naval Health Research Center		Biohazard Protocol (1); Organismal/Cellular Tests
Hawley, Robert	USAMRIID, Ft. Detrick MD	Biosafety, emergent biohazard detection, and containment methods; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (1); Organismal/Cellular Tests
Holland, Heinrich D.	Harvard University, Department of Earth and Planetary Sciences	Earth Sciences	Life Detection Protocol; Organismal/Cellular Tests
Humble, Michael	National Institute of Environmental Health Sciences		Biohazard Protocol (2); Organismal/Cellular Tests
Jahrling, Peter	USAMRIID, Ft. Detrick MD	Biosafety, emergent biohazard detection, and containment methods; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (2); Organismal/Cellular Tests
Joyce, Gerald	Department of Molecular Biology, The Scripps Research Institute	Origins of life; RNA and Pre-RNA Worlds	Biohazard Protocol (2); Molecular Tests
Khan, Ali S.	National Center for Infectious Diseases, Centers for Disease Control and Prevention	Biodefense; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (1) (Co-chair); Molecular Tests
Kovacs, Gregory T.A.	Associate Professor, Electrical Engineering, Stanford University	Biodefense; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (2) (Co-chair); Molecular Tests

PARTICIPANT	AFFILIATION	AREA(S) OF EXPERTISE	SUB-GROUP ASSIGNMENTS (Day 1; Day 2)
Leonard, Debra G.B.	Dept. of Pathology and Laboratory Medicine University of Pennsylvania	Molecular pathology of infectious diseases; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (1); Molecular Tests
MacPherson, Glenn	National Museum of Natural History, Smithsonian Institution	(Planning Committee Member)	Biohazard Protocol (2); Physical and Chemical Tests
Maurel, Marie-Christine	Institut Jacques Monod	Microbiology; life origins	Life Detection Protocol; Molecular Tests
Moutou, François	Head of the laboratory of General Epidemiology at the Central laboratory for veterinary research	Epidemiology of major animal diseases and zoonosis; modeling of airborne dissemination of the FMD virus; Epidemiology of Transmissible Spongiform Encephalopathies; Risk analysis methodology and disease control; Epidemiological surveillance of wild and domestic animal diseases.	Biohazard Protocol (2); Organismal/Cellular Tests (Co-chair)
Mustin, Christian	Centre de Pédologie Biologique		Life Detection Protocol; Physical and Chemical Tests (Co-chair)
Pardee, Arthur B.	Dana Farber Cancer Institute Biological Chemistry and Molecular Pharmacology	Molecular evolution; cell cycle control; cancer etiology	Biohazard Protocol (1); Organismal/Cellular Tests
Prieur, Daniel	Université de Bretagne Occidentale		Life Detection Protocol; Molecular Tests (Co-chair)
Prufert-Bebout, Lee	NASA Ames Research Center	(Planning Committee Member)	Life Detection Protocol; Organismal/Cellular Tests
Race, Margaret	SETI Institute	(Planning Committee Member)	Biohazard Protocol (1); Molecular Tests
Raulin, François	Universities Paris 12 & 7		Life Detection Protocol (Co-chair); Physical and Chemical Tests
Richmond, Jonathan	Director, Office of Health and Safety, Centers for Disease Control and Prevention	Biosafety, emergent biohazard detection, and containment methods; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (2); Organismal/Cellular Tests (Co-chair)
Rummel, John	Planetary Protection Officer, NASA Headquarters	(Planning Committee Chair)	"Floater"
Scannon, Patrick J.	Chief Scientific and Medical Officer XOMA Corp.	Microbial pharmacology	Biohazard Protocol (2); Molecular Tests
Schad, Jack	NASA Headquarters	(Planning Committee Member)	Biohazard Protocol (1); Organismal/Cellular Tests
Sourdive, David J.D.	Centre d'Etudes du Bouchet	Viral immunology, arenaviruses; Biotechnology project leader at CEB (Min. of Defense); High sensitivity detection and identification of potentially hazardous microorganisms	Biohazard Protocol (1) (Co-chair); Molecular Tests
Stabekis, Pericles D.	Lockheed-Martin, Washington DC	(Planning Committee Member)	Biohazard Protocol (2) Physical and Chemical Tests
Vasil, Indra K.	Professor, Plant Cell and Molecular Biology, University of Florida	Plant tissue culture methods and biotechnology; biohazard testing; cellular and molecular genetic mechanisms in pathogenesis	Biohazard Protocol (1); Organismal/Cellular Tests
Viso, Michel	CNES, France	Secretary of the French PP group. Program scientist for animal Physiology and Biology. Radionucleides in biology, Applied Medical Statistics, Animal and Comparative Immunology	"Floater"
Wainwright, Norman R.	Senior Scientist, Molecular Biology, Marine Biological Laboratory	Comparative molecular biology and evolution; life detection	Life Detection Protocol (Co-chair); Molecular Tests
Observers:			
Beaty, David	NASA, Jet Propulsion Laboratory		"Floater"
Boyce, Joseph	NASA Headquarters		"Floater"
Hoyt, Diana	NASA Headquarters		"Floater"
David, Leonard	Science Writer		"Floater"
Lindstrom, David	NASA, Jet Propulsion Laboratory		"Floater"
Meyer, Michael	NASA Headquarters		"Floater"

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WORKSHOP #2 SUB-GROUP CHARTERS AND MEMBERS

(10/16/00)

DAY 1 (Wednesday October 25, 2000)

Life Detection Protocol Sub-Group

The goals are to: a) detect the presence of live organisms, or materials derived from live organisms ('biomarkers'), and b) distinguish between martian life forms or biomarkers and terrestrial contamination. The specific objectives to be accomplished are: a) identify and prioritize current candidate methods to detect live organisms and biomarkers, b) identify and prioritize current candidate methods to detect terrestrial contamination, c) specify sample size, sample type, and analysis time requirements, and d) select specific current methods, and place them in a specific sequence, such that the life detection protocol can be accomplished in a reasonable amount of time (≤ about 90 days ?) and using the minimum amount feasible of a presumed 500 g sample.

Wainwright, Norman R. (Chair)
Raulin, François (Co-chair)
Allton, Judith H.
Bada, Jeffrey
Bradley, John
Crissman, Harry A.
DeVincenzi, Donald
Holland, Heinrich
Maurel, Marie-Christine
Mustin, Christian
Prieur, Daniel
Prufert-Bebout, Lee
(12)

Biohazard Protocol Sub-Groups (2 sub-groups on this same topic)

The goal is to determine if the samples pose any threat to terrestrial organisms or ecosystems, and whether or not the samples contain life forms or biomarkers. The specific objectives to be accomplished are: a) to identify and prioritize current candidate methods to determine any threat to terrestrial organisms or ecosystems, b) to specify sample size, sample type, and analysis time requirements, and c) to select current specific methods, and place them in a specific sequence, such that the biohazard protocol can be accomplished in a reasonable amount of time (≤ about 90 days ?) and using the minimum amount feasible of a presumed 500 g sample.

Khan, Ali S. (Chair)
Sourdive, David J.D. (Co-chair)
Allen, Carl
Daly, Michael J.
Fishbein, William N.
Giroir, Brett P.
Grange, Jacques
Gray, Greg
Hawley, Robert
Leonard, Debra G.B.
Pardee, Arthur B.
Race, Margaret
Schad, Jack
Vasil, Indra K.
(14)

Kovacs, Gregory T.A. (Chair)
Candresse, Thierry (Co-chair)
Bielitzki, Joseph
Eisen, Johnathan
Gabriel, Dean W.
Humble, Michael
Jahrling, Peter
Joyce, Gerald
MacPherson, Glenn
Moutou, François
Richmond, Jonathan
Scannon, Patrick J.
Stabekis, Pericles D.
(13)

MARS SAMPLE HANDLING WORKSHOP SERIES

WORKSHOP #2 SUB-GROUP CHARTERS AND MEMBERS

(10/16/00)

DAY 2 (Thursday, October 26, 2000)

Physical and Chemical Tests Sub-Group

The goal is to determine the physical and chemical properties of the samples that must be ascertained prior to the life-detection or biohazard tests so that: a) samples can be intelligently selected for the life detection and biohazard protocols, and b) life detection and biohazard protocol results can be properly interpreted. The specific objectives to be accomplished are: a) identify and prioritize current candidate methods for these physical and chemical tests, b) specify minimum sample size, sample type, and analysis time requirements, and c) select specific current methods, and place them in a specific sequence, such that the physical and chemical analysis protocol can be accomplished in the minimum time feasible, and with the minimum amount of a presumed 500 g sample. Specify which of these methodologies might be done on irradiation-sterilized or heat-sterilized samples.

Allen, Carl (Chair)
Mustin, Christian (Co-chair)
Allton, Judith H.
Bradley, John
DeVincenzi, Donald
Holland, Heinrich
MacPherson, Glenn
Raulin, François
Stabekis, Pericles D.
(9)

Molecular Tests Sub-Group

The goal is to indicate and/or illustrate specific molecular tests and procedures that will be employed to accomplish either the consensus biohazard protocol from Day 1, or to accomplish a protocol that is consistent with one or the other biohazard protocols reported to the plenary session. This Sub-group should specify current candidate methods for these tests, the instrumentation needed to accomplish these tests *in situ*, and the minimum sample size, sample type, specific sequence, and analysis time requirements for each test that is described.

Joyce, Gerald (Chair)
Prieur, Daniel (Co-chair)
Bada, Jeffrey
Daly, Michael J.
Eisen, Johnathan
Khan, Ali S.
Kovacs, Gregory T.A.
Leonard, Debra G.B.
Maurel, Marie-Christine
Race, Margaret
Scannon, Patrick J.
Sourdive, David J.D.
Wainwright, Norman R.
(13)

Biohazard + Life Detection

physical chemical Molecular

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WORKSHOP #2 SUB-GROUP CHARTERS AND MEMBERS

(10/16/00)

DAY 2 (Thursday, October 26, 2000)

Organismal/Cellular Tests Sub-Group

The goal is to indicate and/or illustrate specific *in vivo* and *in vitro* tests and procedures that will be employed to accomplish either the consensus biohazard protocol from Day 1, or to accomplish a protocol that is consistent with one or the other biohazard protocols reported to the plenary session. This Sub-group should specify current candidate methods for these tests, the facilities and instrumentation needed to support such tests *in situ*, and the minimum sample size, sample type, specific sequence, and analysis time requirements for each test that is described.

Richmond, Jonathan (Chair)
Moutou, François (Co-chair)
Bielitzki, Joseph
Candresse, Thierry
Crissman, Harry A.
Fishbein, William N.
Gabriel, Dean W.
Giroir, Brett P.
Grange, Jacques
Gray, Greg
Hawley, Robert
Humble, Michael
Jahrling, Peter
Pardee, Arthur B.
Prufert-Bebout, Lee
Schad, Jack
Vasil, Indra K.
(17)

"Floaters" (both days)

Sara E. Acevedo, David Beaty, Joseph Boyce, Leonard David, Diana Hoyt, David Lindstrom, Michael Meyer, John Rummel, and Michel Viso (9)

Notes:

A *working lunch is scheduled on Wednesday, October 25th for all sub-group Chairs and Co-chairs* to discuss the sub-group charters in detail (meet at noon at the Marriott Hotel). An outline of the requested sub-group reports and writing instructions will be provided to the Chairs and Co-chairs at that meeting.

In recommending methods, test systems, and instruments, each sub-group should address the issues of sampling error and 'test insufficiency' that may pertain to 'missing' something that is in the sample, but may not be detected.

Using the report of Workshop 1 as a point of departure, each sub-group should attend to the writing in whatever depth can be accomplished during the workshop. The guidelines for preparing the final sub-group summaries is attached.

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WORKSHOP #2 WRITING INSTRUCTIONS TO SUB-GROUP CHAIRS

(10/16/00)

In preparing the summary reports for each sub-group, the writers are urged to consider the following format suggestions to ensure consistency in the final Workshop 2 report.

1) Title of Sub-group and exact Sub-group charter

2) Members of Sub-group (Chair and Co-chair identified)

3) Introduction; Background Information; and Starting Assumptions (if any)

4) Overview of Preliminary Deliberations:
   - Candidate methods - identify and prioritize viable alternatives; include comments or caveats for each as appropriate
   - Candidate model systems to be used for testing (as appropriate)
   - Candidate instrumentation or equipment needed
   - Estimated amount of material for various tests
   - Estimated time required for test results

5) Specific Recommendations: (Ideally this section should be a bulleted, annotated list with brief details. Extensive details should be included in an appendix if needed):
   - Based on discussion of various alternatives (above) indicate the selected list of specific methods, test systems and instrumentation recommended and the sequence of tests needed to accomplish the charge (life detection or biohazard etc)
   - Indicate estimated amount of sample needed
   - Indicate estimated amount of time needed
   - Identify whether test will be done inside or outside containment

6) Include flow charts/diagrams of process; how various tests relate to each other

7) Additional Information - May include topics such as the following:
   - Caveats?
   - R&D needs?
   - Anticipated problems and interpretation of the test for various scenarios (possible live organisms, biomarkers, false positives, or fossils)
   - How does the list of recommended tests relate to the Criteria for Release (Critical? Essential? Complementary? Supportive? etc.)
   - Other issues to be resolved or discussed at next workshop?

8) **Send a hard copy *and* an electronic version of your Sub-group summary no later than Friday Nov. 10, 2000 to:**

Ms. S.E. Acevedo
Mail Stop 245-1
NASA Ames Research Center
Moffett Field CA 94035-1000
USA

sacevedo@mail.arc.nasa.gov

MARS SAMPLE HANDLING PROTOCOL WORKSHOP SERIES

WORKSHOP #2 FINAL LOGISTICS SUMMARY

(10/16/00)

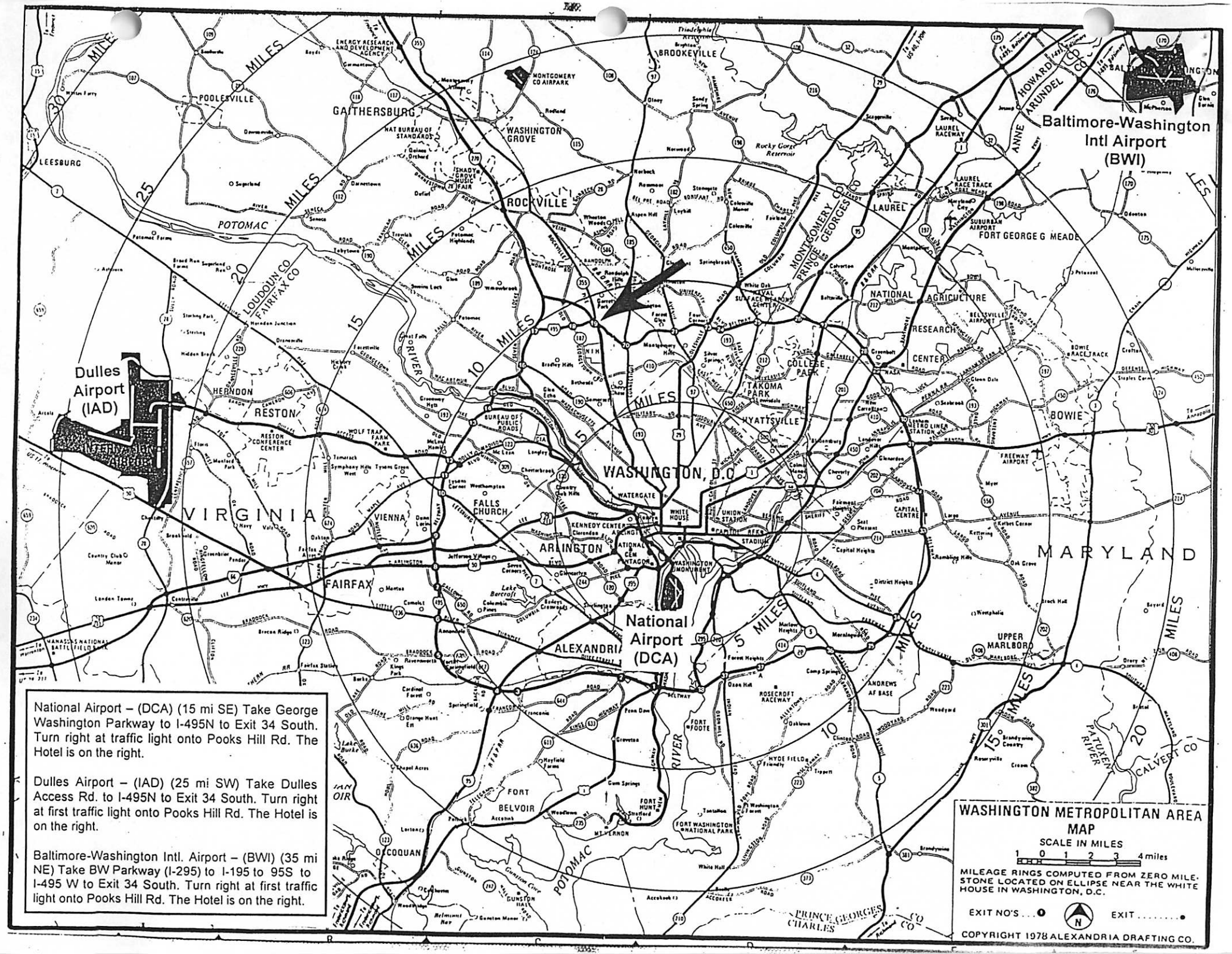
1) Venue & Directions:
   - Marriott Hotel, 5151 Pooks Hill Road, Bethesda, Maryland.
   - The Marriott is at the intersection of I-495 (the "Washington Beltway") and Route 355 (Wisconsin Avenue). *(A map of the greater Washington D.C. area is attached).*
   - The telephone number for the front desk at the hotel is 301-897-9400.
   - The web site for the Marriott Bethesda is http://marriotthotels.com/WASBT/
   - The name and location of the meeting room(s) will be posted in the hotel lobby.

2) Airports/Shuttles/Autos:
   - Commercial Airport Shuttle service: *Super Shuttle* (1-800-258-3826).
   - Complimentary Marriott hotel shuttle service to/from the Metro (301-897-9400).

3) Accommodations:
   - If you are a U.S. Civil Servant, and unable to accept NASA research funds to pay for your room, simply present your own credit card when you arrive at the hotel to register (your room *may* have been reserved by Sara using her card). *It is the responsibility of each U.S. Civil Servant to operate according to the protocol of their agency regarding accepting travel reimbursements for this NASA-sponsored Workshop. If you have any questions or concerns about your room reservation, see Sara at the Workshop or call or e-mail (see cover letter for contact info).*

4) Speakers and Sub-group Chairpersons:
   - One 35mm slide projector, one overhead viewgraph projector, and a cordless microphone will be available in the plenary meeting room for your use.
   - Speakers: *please bring to the Workshop* one hard copy of your presentation materials and e-mail the electronic file to Sara.
   - Sub-group Chairpersons: please see the attached sub-group summary writing guidelines.

5) Breakfast and Lunch:
   - Breakfast and lunch will be provided for ALL attendees on Thursday and Friday Oct. 26th and 27th (breakfast at 7:30 a.m.; lunch at noon).
   - On Wednesday, Oct. 25th, there is a *working lunch scheduled for all Sub-group Chairpersons* to meet with Dr. Rummel et al. to review the Sub-group Charters and writing guidelines (see attached).



National Airport – (DCA) (15 mi SE) Take George Washington Parkway to I-495N to Exit 34 South. Turn right at traffic light onto Pooks Hill Rd. The Hotel is on the right.

Dulles Airport – (IAD) (25 mi SW) Take Dulles Access Rd. to I-495N to Exit 34 South. Turn right at first traffic light onto Pooks Hill Rd. The Hotel is on the right.

Baltimore-Washington Intl. Airport – (BWI) (35 mi NE) Take BW Parkway (I-295) to I-195 to 95S to I-495 W to Exit 34 South. Turn right at first traffic light onto Pooks Hill Rd. The Hotel is on the right.