DIRECTORY OF ORGANIZATIONS,
INVESTIGATORS, SPONSORS, AND PROGRAMS
IN RAPID SOLIDIFICATION TECHNOLOGY

T. F. Kearns

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Prepared for
Defense Advanced Research Projects Agency

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The Institute for Defense Analyses (IDA) was asked by the Defense Advanced Research Projects Agency (DARPA) to make an assessment of rapid solidification technology (RST) and its Department of Defense applications. In doing so, it was appropriate to identify the organizations, investigators, sponsors and programs active in the field in the United States and Canada. Emphasis in the IDA assessment is on (continued)
materials of construction rather than on electrical or magnetic materials.

The Directory lists 115 organizations active in the field with addresses, names, and telephone numbers of about 250 investigators, and 21 sponsoring organizations. It includes also a listing of topics being studied by the various organizations.
FOREWORD

The Institute for Defense Analyses (IDA) was asked by the Defense Advanced Research Projects Agency (DARPA) to make an assessment of rapid solidification technology (RST) and its Department of Defense applications. In doing so, it was appropriate to identify the organizations, investigators, sponsors, and programs active in the field in the United States and Canada. Inasmuch as emphasis in the IDA assessment is on materials of construction rather than on electrical or magnetic materials, that emphasis was reflected in this survey.

The information contained in the directory was compiled by starting with a list of investigators, and their organizations, who had published papers in the field. To these a direct mail questionnaire was sent, requesting information on current activity and future plans, together with identification of others, not on the original list, thought to be active in the field. No attempt was made to identify individual investigators. Organizations were asked only for the names and telephone numbers of appropriate contacts and the topics being studied.

As in any such compilation made over a brief period, there will be omissions, particularly of organizations which may be evaluating RST products. Lack of response to the questionnaire has probably also resulted in omissions. However, we believe that most of the organizations active in RST research and development have been identified. These are listed alphabetically in Section I of the directory with addresses, the names of contacts, telephone numbers, and the topics being investigated.
In Section II, agencies which are, or are likely to be, sponsoring RST research and development are listed, again with addresses, the names of appropriate contacts, and telephone numbers. The "S" following the numbers of agencies in Section II indicates "sponsor" and was used to simplify reference to people in Section III. In Section III contact names are listed alphabetically.

It will be noted that several people are listed both as sponsors and as contacts for work being done within their organizations.

We believe that the directory affords an overview of work in progress and that it will help assessment of the distribution of effort, areas of emphasis, possible gaps, and objectives not being effectively pursued. It is being distributed to respondents to the questionnaire and to others with the hope that it may facilitate communications in the field, thus improving efficiency and accelerating the rate of progress in research and development efforts.
SECTION I - ORGANIZATIONS, INVESTIGATORS, AND PROGRAMS

1. Air Force Wright Aeronautical Laboratories
   Flight Dynamics Laboratory
   Wright Patterson Air Force Base, OH 45433
   L.G. Kelly AFWAL/FIBCR (513) 255-2521
   F.D. Boensch AFWAL/FIBAA (513) 255-5006
   Programs:
   1. Structural concepts evaluation

2. Air Force Wright Aeronautical Laboratories
   Materials Laboratory
   Wright Patterson, Air Force Base, OH 45433
   Dr. H. Burte (513) 255-5348
   Dr. D. Voss (513) 255-4018
   G. Eichelmann (513) 255-4018
   Dr. H. Graham (513) 255-4402
   Programs:
   1. High-strength aluminum alloy powder metallurgy
   2. Titanium/titanium alloy powder metallurgy
   3. Superalloy powder metallurgy
   4. Aluminides powder metallurgy
   5. Coatings

3. Allied Chemical Corporation
   Columbia Turnpike, P.O. Box 1021R
   Morristown, NJ 07960
   Materials Laboratory, Corporate R&D
   Dr. Lance A. Davis (201) 455-2001
   Metglas Products
   Dr. Nicholas J. Decristofaro (201) 455-2976
   Consolidated Metal Products
   Julian H. Kushnick (201) 455-2361
   Dr. J. Dickson (201) 455-2504
   Programs:
   1. Alloy development of ferromagnetic metallic glasses
   2. Process development for fabrication of glassy metal strips
   3. Development of technology for fabrication of Metglas distribution transformer material
   4. Development of rapid solidification technology for powder production
   5. Structure/property relationships in devitrified glassy powders
6. Amorphous ribbon for brazing foils, magnetic and other applications.
7. Rapidly solidified metal powders for powder metallurgy consolidation into bulk shapes for high temperature, wear-resistant, and structural applications.

4. Alcoa Laboratories
Alcoa Center, PA 15069
W.S. Cebulak, Mgr. RSP Alcoa Labs. (412) 337-2324
1. Elevated-temperature aluminum alloy development
2. Advanced aluminum alloy from rapidly solidified particulate
3. Precision aluminum alloy powder metallurgy structural components
4. Low-cost manufacturing methods for high-strength P/M aluminum wrought products
5. Fundamentals of compaction processes for rapidly quenched prealloyed metal powders
6. Cobalt-free high-strength aluminum P/M alloy

5. Ames Laboratory (DOE)
Iowa State University
Ames, IA 50011
R.S. Hansen (512) 294-4446
C.W. Chen
Programs:
1. Fabrication of amorphous ribbons (Fe-B-Be and Fe-B-Au) by splat cooling and magnetic properties and crystallization behavior of these ribbons.

6. Argonne National Laboratory
Materials Science Division
9700 S. Cass Avenue
Argonne, IL 60439
R. Dowagala (312) 972-5094
T. Wieneck (312) 972-5020
1. The development of corrosion-resistant chromium-free ferrous alloys (a rapid solidification activity will be part of this program)

7. ARMCO INC.
Research & Technology
703 Curtis Street
Middletown, OH 45043
C.E. Ward (513) 425-2797
Programs:
1. Evaluate the magnetic properties of amorphous metals (rapidly solidified alloys) for use in transformers
8. U.S. Army Applied Technology Laboratory  
Fort Eustis, VA  
J.W. Lane (804) 878-3977  
Programs:  
1. Evaluation of RST alloys

9. U.S. Army Armament Research and Development Command (ARPA/DCOM)  
DRMR-SCM-P Bldg. 355  
Dover, NJ 07801  
Dr. J. Waldman (201) 328-5911  
M. Kumar (201) 328-5916  
Programs:  
1. Characterization of rapidly solidified high-strength aluminum alloys  
2. Thermal-mechanical processing of RST aluminum alloys

10. U.S. Army Armament Research and Development Command  
Metallic Materials Branch Bldg. 355  
Dover, NJ 07801  
Dr. S.J. Cytron (201) 328-5746  
Dr. M. Otooni (201) 328-5746  
Programs:  
1. Rapid solidification technology of armament materials  
2. Processing of rapidly solidified high-density metal alloys  
3. Kinetics of crystallization of rapidly solidified alloys

11. U.S. Army Armament Research and Development Command  
Physical Science Section, Research Branch, Benet Weapons Laboratory  
Watervliet Arsenal, Watervliet, NY 12189  
Dr. Iqbal Ahmad (518) 266-5615  
Mr. Joe Barranco (518) 266-5645  
Programs:  
1. Study effect of cooling rate on the structure and properties of molybdenum powders made by REP.  
2. Develop and characterize molybdenum alloy powders suitable for defense applications.  
3. Study kinetics of sintering and densification of PS molybdenum alloy powders, and determine the mechanical behavior of the densified alloys in the temperature range of RT-1200°C.

12. U.S. Army Materials and Mechanics Research Center (AMMRC)  
DRXMR-KA  
Watertown, MA 02172  
S. Isserow (617) 923-3504  
Programs:  
1. Evaluation of RST alloys
13. U.S. Army Mobility Equipment Research and Development Command (MERADCOM)
DRDME-PM
Fort Belvoir, VA 22060
W.F. McGovern (703) 664-5450
Programs:
1. Evaluation of RST superalloys

14. Avco Lycoming Division
Materials Engineering and Development
550 S. Main Street
Stratford, CT 06497
L.J. Fiedler (203) 378-211 x229
Dr. P.J. Bania
Programs:
1. Evaluation of high-temperature properties of RST materials

15. Battelle Columbus Laboratories
505 King Avenue
Columbus, OH 43201
Dr. R.S. Carbonara (614) 424-5440
R.E. Mariner (614) 424-4314
J.L. McCall (614) 424-4030
Programs:
1. Processes for the production of rapidly solidified amorphous and microcrystalline strip, fibers, flakes, and powder
2. Consolidation of rapidly solidified amorphous and microcrystalline metals
3. Characterization of structural, corrosion, mechanical, and electromagnetic properties of rapidly solidified materials
4. Application of rapidly solidified materials to industrial and government needs
5. Production of superalloy and Ti-, Al-, Cu-, Ni-, Fe-, Zn-, Sn-, Pb-based alloy powders, fibers, flakes, and strip
6. Economic analysis of rapid solidification processes

16. Battelle Pacific Northwest Laboratory
P.O. Box 999
Richland, WA 99352
S.D. Dahlgren (509) 375-0120
J.T. Prater
D.P. Baer
W.T. Pawlewicz
J.W. Patten
M.D. Merz
Programs:
1. Oxidation and corrosion resistance of sputter-deposited fine-grained and amorphous metals.
2. Influence of sputtering parameters on structure and behavior of sputter-deposited metallic and insulator materials.

17. Bell Telephone Laboratories
Mountain Avenue
Murray Hill, NJ 07974
K.A. Jackson (201) 582-4188
Dr. M.L. Green, Rm. 1B301 (201) 582-5310
1. Basic studies of interface dynamics during rapid solidification
2. Segregation effects during high-speed crystallization

18. Bethlehem Steel Corporation
Homer Research Labs.
Bethlehem, PA 18016
Dr. J.M. Chilton (215) 694-3320
Dr. B.L. Bramfitt (215) 694-6485
Dr. H.E. Townsend (215) 694-6674
1. Application of RST to wear-resistant high alloy irons
2. Application of RST to electrical and magnetic steel sheet
3. Corrosion of RST metals

19. The Boeing Company
P.O. Box 3707, M/S 73/43
Seattle, WA 98124
Dr. Wm. E. Quist (BCAC) (206) 237-5650
Dr. G. Hari Naranayan (BCAC) (206) 237-5650
Dr. K. B. Das (BAC) (206) 237-9725
1. Development of high-strength aluminum P/M alloys
2. High-strength powder metallurgy aluminum mill products
3. Commercial aircraft applications of X7090 and X7091 P/M alloy forgings and extrusion products
4. Development of surface finish systems for the P/M alloy X7090
5. Cobalt-free high-strength aluminum P/M alloy
6. Development of SiC (particulates and whiskers) reinforced X7090 metal matrix composites
7. Development and assessment of lithium-bearing aluminum P/M alloys (new program)

20. Brown University
Department of Engineering - Physics
Brown Station
Providence, RI 02912
Prof. J. Tauc (401) 863-1000
1. Stability of metallic glasses
   2401 E Street, N.W.
   Washington, DC 20241
   K.W. Mlynarski, Rm. 813 (202) 634-1138
   Programs:
   1. Titanium RST alloys (Albany OR)
   2. Ceramics (Tuscaloosa AL)

22. Cabot Corporation
    Technology Department
    1020 West Park Avenue
    Kokomo, IN 46901
    Christian L. Jeanfils (317) 456-6251
    Anthony J. Hickl (317) 456-6216
    Programs:
    1. Hardfacing by welding: this research program is planned to start in the summer of 1981
    2. Powder atomization techniques, high-solidification-rate techniques for superalloy powers

23. University of California at Los Angeles
    Dept. of Materials Engineering
    405 Hilgard Avenue
    Los Angeles, CA 90024
    Prof. C.N.J. Wagner (213) 825-6265
    Programs:
    1. Structure of liquid and amorphous metallic alloys and structural relaxation of metallic glasses

24. California Institute of Technology
    1201 E. California Blvd.
    Pasadena, CA 91125
    Prof. T.J. Ahrens, Dept. of Physics (213) 795-6811
    Prof. T. Vreeland, Jr. Dept. of Materials Science
    Dr. J. Mayer, Dept. of Electrical Engr.
    Dr. W.L. Johnson, Div. of Engr. & Applied Science
    Programs:
    1. Dynamic compaction of iron and steel powders
    2. Powder production via ion beam heating
    3. Synthesis, structure, and properties of amorphous alloys

    Department of Metallurgical Engr. and Materials Science
    5000 Forbes Avenue
    Pittsburgh, PA 15213
    Prof. J.C. Williams (412) 578-2704
    Prof. R.G. Sekerka (412) 578-2700
    Prof. F. Prinz, Dept. of Mechanical Engr.
1. Kinetics, morphology, and thermodynamics of solid-liquid transition
2. Properties and microstructure of rapidly solidified Ni-Mo-Al-X alloys
3. Powder metallurgy aluminum alloys for high temperature

26. Carpenter Technology Corporation
    P.O. Box 662
    Reading, PA 19603
    Donald R. Muzyka, Division Vice President-Technical (215) 371-2657
    Gunvant N. Maniar, General Manager of P&D Laboratories (215) 371-2783

Programs:
1. Inert gas atomized specialty materials, superalloys, tool steels, stainless and other high alloys
2. Water atomized P/M pilot plant
3. Direct compaction of water-atomized elemental and alloy P/M
4. Compaction technology as it relates intermediate shapes from P/M

27. Clarkson College of Technology
    Department of Physics
    Potsdam, NY 13676
    Prof. S. Arajs (315) 268-2396
    Prof. R. Caton (315) 268-2350

Programs:
1. Electric and magnetic properties of glassy and amorphous materials.
2. Effects of radiation (neutrons, protons, electrons,) on glassy materials.
3. Preparation of glassy materials by spinning method.
4. Crystallization phenomena in glassy structures.

28. Climax Molybdenum Company
    Division of AMAX Inc.
    1600 Huron Parkway
    Ann Arbor, MI 48106
    Dr. M. Semchyshen (313) 761-2300

Programs:
1. Research in RST

29. Columbia University
    918 Mudd Building
    New York, NY 10027
    Prof. John K. Tien (212) 280-5192

Programs:
1. Comparative study of RSR superalloy powders and consolidated structures and argon atomized powders and structures
30. University of Connecticut
Metallurgy Department
Storrs, CT 06268
Prof. Peter R. Strutt (203) 486-3514
Brian G. Lewis (203) 486-4620
Mohan Kurup
Jing-gu-Zhang
Bernard H. Kear (Adjunct Prof. at Univ. of Conn.).
Programs:
1. Electron Beam/Laser Glazing of Iron-Base Materials
   (P.R. Strutt, B.G. Lewis, and Mohan Kurup). This study is involved with the fundamental aspects of rapidly solidified tool steels and iron-base cemented carbide materials, including microstructural characterization and the microstructural dependence on process parameters such as power density and beam velocity. Another aspect involves wear and fatigue fretting studies of glazed surfaces produced by a specially developed programmable beam deflection system.
2. Electron Microscopy of Electron Beam Glazed Alloys
   (Jing-gu-Zhang). A basic investigation of the complex microstructures in rapidly solidified steels using quantitative diffraction contrast analysis.

31. Cornell University
Materials Science Center
Clark Hall
Ithaca, NY 14853
H.H. Johnson (607) 256-4272
D.G. Ast
N.W. Ashcroft
Programs:
1. Mechanical properties of amorphous metals
2. Theoretical studies of ordered and disordered systems

32. Crucible Research Center
Colt Industries, Inc.
Route 60 and Parkway West
Robinson Twp., Pittsburgh, PA 15205
Mailing Address: P.O. Box 88, Pittsburgh, PA 15230
E.J. Dulis (412) 923-2955
J.H. Moll
Programs:
1. HIP of large Ti P/M shapes
2. Dual property integral turbine wheel
3. Production of advanced turbine engine components to near-net shapes by hot isostatic pressing superalloy powder
4. Long-life engine discs from RSR powder
5. Powder cleanliness improvement program
6. ER welded HIP nacelle frame
7. New and improved cutting and forming tool steels by CPM process
8. New method for making high-quality Ti alloy powder
9. Improved containerization methods for making P/M shapes

33. University of Delaware
Department of Physics
Newark, DE 19711
Dr. D.G. Onn (302) 738-2680
Programs:
1. Radiation effects in amorphous metallic alloys

34. Drexel University
Department of Materials Engineering
32nd and Chestnut Streets
Philadelphia, PA 19104
Prof. Alan Lawley (215) 895-2326
1. High-chromium white irons from rapidly solidified powders - structure vs properties
2. Tool steels from rapidly solidified powders - structure vs properties
3. High-strength aluminum alloys from rapidly solidified powders - fatigue response
4. Elevated-temperature aluminum alloys from rapidly solidified powders (planned)

35. nWA Composite Specialties, Inc.
21133 Superior Street
Chatsworth, CA 91311
Dr. W.C. Harrigan
J.F. Dolowy, Jr.
B.A. Webb
E.C. Supan
(213) 998-1504
Programs:
1. Processing to stiff, strong-particle-reinforced aluminum materials with isotropic properties
2. Developing constituent interaction models for RST light metals reinforced with ceramic particulate mate-
rial
3. Processing development to produce forged and extruded structures from particulate-reinforced RST forms of aluminum and magnesium

36. Exxon Enterprises - Materials Division
P.O. Drawer H, Old Buncombe at Poplar
Greer, SC 29651
J.O. Pickens (803) 877-0123
P.E. Hood
1. RSR/Silicon carbide whisker composites
37. University of Florida  
Department of Materials Science and Engineering  
Gainesville, FL 52611  
Dr. R.W. Gould (904) 392-1457  
1. Rapidly solidified Ni-Al-Mo alloy research.  
characterization

38. Garrett Turbine Engine Company  
A Division of The Garrett Corporation  
111 South 34 Street, P.O. Box 5217  
Phoenix, AZ 85010  
Dr. T.E. Stranqman (602) 267-4399  
P.P. Millan, Jr. (602) 267-4129  
Programs:  
1. Advanced turbine airfoil alloys  
2. High-temperature-capability disk alloys  
3. High-temperature-capability aluminum alloys

39. General Electric Company  
Aircraft Engine Group  
Material and Process Technology Laboratory  
Evendale Plant  
I-75 & Newmann Way  
Cincinnati, OH 45215  
A.M. Johnson (513) 243-5085  
Programs:  
1. Long life engine disks from gas-atomized powders  
2. Melt spinning  
3. Rapid solidification plasma deposition

40. General Electric Corporate Research and Development  
Schenectady, NY 12301  
Dr. H.H. Liebermann (518) 385-8072  
Dr. R.G. Rowe (518) 385-8387  
Dr. L.A. Johnson (518) 385-8181  
Programs:  
1. Melt-spinning of Ni-Base superalloys  
2. Processing and properties of amorphous alloys for electromagnetic applications.

41. Georgia Institute of Technology  
Fracture and Fatigue Research Laboratory  
School of Chemical Engineering  
Atlanta, GA 30332  
Dr. Edgar A. Starke, Jr. (404) 994-2880  
Dr. Thomas H. Sanders (404) 894-2816  
Programs:  
1. Advanced aluminum alloys from rapidly solidified powders
42. Gould Laboratories Materials Research
Gould Inc.,
540 East 105th Street
Cleveland, OH 44108
Dr. David H. Po (216) 371-8718
Programs:
1. Direct rolling of high-strength aluminum powder metal strip
2. Evaluation of rapidly solidified aluminum alloy powders for high-temperature applications
3. Manufacturing techniques for high-strength aluminum near-net-shapes
4. Manufacturing techniques for SiC/Al composite
5. Microstructural analysis of rapidly solidified aluminum alloy powders

43. GTE Laboratories Incorporated
Precision Materials Technology Center
40 Sylvan Road
Waltham, MA 02254
Dr. R.P.I. Adler (617) 890-8460
Dr. S.C. Hsu (617) 890-8460
Dr. D.M. Koffman (617) 890-8460
Programs:
1. Rapid Solidification Process Development and Implementation Studies
   a. Analytical Process Characterization
      1) Heat and mass transfer modeling
      2) Process parameter characterization
   b. Process Development/Industrial Upscaling for:
      1) Chill block melt spinning
      2) Double roller melt spinning
      3) Melt extraction (crucible and pendant drop)
      4) Powder making
      5) Composite and laminate production
   c. Materials Evaluation of Amorphous, Microcrystalline, and Crystalline products
      1) Characterization of as-formed products
      2) Post forming thermo-mechanical treatments of metastable products

44. Harvard University
Division of Engineering and Applied Physics
Cambridge, MA 01238
Prof. D. Turnbull (617) 868-7600
Programs:
1. Formation of metallic glasses

45. University of Hawaii at Manoa
2500 Campus Road
Honolulu, HI 96822
B.E. Liebert
Programs:
1. Basic research in RST

46. Homogeneous Metals, Inc.
P.O. Box 294
Clayville, NY 13322
Charles W. Fox (315) 839-5421
Programs:
1. Development of atomization technique
2. Direct consolidation of powders

47. Howmet Turbine Components Corp.
475 Steamboat Road
Greenwich, CT 06830
Wm. R. Freeman, Jr. (203) 661-7218
Louis L. Dardi (616) 894-7562
Programs:
1. Development of rapid solidification processing equipment
2. Alloy development

48. University of Illinois, Urbana-Champaign
College of Engineering
Urbana, IL 61801
Prof. D.C. Drucker (217) 333-1000
R.D. Field
Programs:
1. Structure of rapidly-solidified superalloy powders

49. Institute for Defense Analyses
400 Army-Navy Drive
Arlington, VA 22202
T.F. Kearns (703) 558-1643
Programs:
1. An assessment of rapid solidification technology and its Department of Defense applications.

50. International Business Machines (IBM)
T.J. Watson Research Center
Yorktown Heights, NY 10598
G.S. Cargill III
Programs:
1. Structure of amorphous metals

51. Johns Hopkins University
Applied Physics Laboratory
Johns Hopkins Road
Laurel, MD 20810
Dr. T.O. Poehler  
K. Moorjani

Programs:
1. Amorphous iron borides

52. Johns Hopkins University
   Materials Science Department
   Baltimore, MD 21218
   Prof. R.B. Pond, Sr.  
   (301) 338-7125

Programs:
1. Chill block melt spinning
2. Puddle melt extraction

53. Kaiser Aluminum & Chemical Corporation
    Center for Technology
    P.O. Box 877
    Pleasanton, CA 94566
    T.R. Pritchett  
    I. Broverman  
    J.L. Dassel  
    S.G. Roberts
    (415) 462-1122

Programs:
1. Aluminum alloy powder metallurgy
2. Aluminum alloy solidification kinetics and structures

54. Lawrence Livermore National Laboratory
    P.O. Box 808
    Livermore, CA 94550
    G. Dorough  
    B. Holt  
    C. Cline
    (415) 422-4892

Programs:
1. Synthesis of amorphous, metastable crystalline, or
   supersaturated solid solutions of beryllium-containing
   alloys by rapid-quench techniques.

55. Lockheed California Company
    P.O. Box 551
    Burbank, CA 91520
    R.F. Simenz
    Dept. Manager, Materials & Processes
    Lockheed California Company, Burbank, CA.
    (213) 847-3647

Programs:
1. System study, transport aircraft
2. Supersonic cruise aircraft research
3. High-temperature aluminum development
4. Manufacturing methods for aluminum PM precision
   forgings
5. Aluminum powder metallurgy alloys for
   superplastic forming
56. **Lockheed-Georgia Company**  
Dept. 72-77 Zone 450  
Marietta, GA 30063  
Dr. Walter S. Cremens (404) 424-4694  
William F. Rates, Jr. (404) 424-3902  
Programs:  
1. Evaluation of aluminum alloys and steels made by powder metallurgy from rapidly solidified powders.

57. **Lockheed Palo Alto Research Laboratory**  
Lockheed Missiles and Space Company  
3251 Hanover Street  
Palo Alto, CA 94304  
R.E. Lewis (413) 493-4411 x 45743  
I.G. Palmer (415) 493-4411 x 45028  
Programs:  
1. Development of advanced aluminum alloys from rapidly solidified powders for aerospace structural applications  
2. Advanced aluminum alloys from rapidly solidified particulate

58. **Los Alamos National Laboratory**  
Chemistry-Materials Science Division  
Los Alamos, NM 87545  
Dr. J.R. Cost (505) 667-2248  
Dr. R.O. Elliott (505) 667-4706  
Programs:  
1. Activation energies for atomic motion in Metglas alloys  
2. Irradiation-enhanced diffusion in metallic glasses  
3. Diffusion of hydrogen and/or helium in metallic glasses  
4. Effect of fission-fragment irradiation on SRO in a metallic glass  
5. Irradiation-induced amorphisation and development of prediction criteria for the process

59. **M-Structures, Inc.**  
Box 564, 299 Ridge Road  
Westminster, MD 21157  
Robert B. Pond, Jr. (301) 876-6801  
Programs:  
1. Vacuum die-cast alloy shaped charge liners

60. **Marko Materials, Inc.**  
144 Randeway Road  
North Billerica, MA 01862  
Dr. Ranjan Ray (617) 663-2210  
Programs:  
1. Scale-up of a rapid solidification powder process  
2. Development of RSP iron-base alloys with high strength and/or high wear, oxidation- and/or corrosion-resistant properties
3. Development of RSP aluminum alloys for high-strength applications at elevated temperature

61. Martin Marietta Laboratories
1450 South Rolling Road
Baltimore, MD 21227
Dr. Joseph R. Pickens (301) 247-0700 x 373
Programs:
1. Stress-corrosion cracking and liquid metal embrittlement in rapidly solidified alloy, CT 91 (7091)
2. Stress corrosion in rapidly solidified alloys CT 91 and MR 61, compared with mechanically alloyed material, IN 9051.

62. MARVALAUD, INC.
P.O. Box 331
Westminster, MD 21157
Prof. Robert B. Pond, Sr. (301) 876-2477
John Winter
Programs:
1. Chill block and free flight melt spinning process development
2. Puddle melt extraction process development
3. Development of processes producing rapidly solidified disintegrated metals and alloys
4. Investigation and exploitation of metal and alloy properties resulting from the operation of the above processes

63. Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139
Prof. Morris Cohen (616) 253-3324
Prof. Merton C. Flemings (616) 253-3233(4)
Prof. Nicholas J. Grant (616) 253-5637
Prof. Ronald Latanision (616) 253-4697
Prof. Roy Kaplow (616) 253-3322
Prof. Frederick J. McGarry (616) 253-7172
Prof. Julian Szekely (616) 253-3236
Prof. John B. Vander Sande (616) 253-6933
Prof. Gregory Yurek (616) 253-3239
Prof. Kenneth Russell (616) 253-3328
Programs:
1. Deformation and fracture behavior of rapidly solidified carbide dispersion strengthened superalloys at high temperatures (Grant)
2. Crack initiation and growth in high-temperature superalloys under high-temperature creep conditions (Grant)
3. Superplastic deformation of mixed alpha-gamma stainless steels prepared from rapidly quenched particulates (Grant)
4. The mechanical behavior of metallic glasses (Grant)
5. The role of alloying on the stability and properties of Pd-Si glasses (Grant)
6. The properties of Ni₆₀-Nb₄₀ glasses (Grant)
7. Structure and properties of lithium-alloyed 2024 and Al-Mg-Li/type aluminum alloys prepared from rapidly solidified particulates (Grant)
8. The structure and properties of aluminum alloy 2020 + Li produced by rapid solidification from the melt (Grant)
9. The potential for oxide-dispersed, rapidly solidified, fine-grained ultrasonically atomized aluminum alloys for high-temperature service (Grant)
10. Oxide-dispersed type 316 stainless steels produced from rapidly quenched fine powders (Grant)
11. Type 316 stainless steels prepared from rapidly quenched particulates as first wall fusion reactor materials (Grant)
12. The structure and properties of rapidly solidified, titanium-modified 316 stainless steel first wall fusion reactor alloy (Grant)
13. High-strength, high-temperature, high-thermal-conductivity copper-base alloys (Grant)
14. The structure and properties of high-thermal-conductivity, high-temperature, high-strength, copper-based alloys produced by rapid solidification (Grant)
15. The crystallization and consolidation of high glass transition temperature metallic glasses (Grant)
16. Preliminary work on ion irradiation of first wall materials (Russell)
17. Rapidly solidified Ti-modified 316 stainless steels for irradiation environments (Grant, Vander Sande)
18. Study of void nucleation under irradiation with continuous helium generation (Russell)
19. Chemical stability of metallic glasses (Latanision)
20. Hydrogen permeation and embrittlement in metallic glasses (Latanision)
21. Structure of amorphous and semi-crystalline polymers (Vander Sande)
22. Oxidation resistance of rapidly solidified austenitic steels (Yurek)
23. Ultra-rapid solidification (Flemings)
24. Rapid solidification of magnesium (Flemings)
25. Undercooling, structure, and rapid solidification (Flemings)
26. Mathematical modelling of rapid quenching techniques (Szekely)
27. Rapid solidification of thermoplastics (McGarry)
28. Crystallization of Fe-B glasses (Kaplow)
29. STEM microanalysis of rapidly solidified steels (Cohen, Vander Sande)
30. Grain growth behavior of rapidly solidified steels (Cohen, Vander Sande)
31. Fracture toughness of rapidly solidified steels (Cohen)
32. Tempering behavior of rapidly solidified martensitic steels (Cohen, Vander Sande)
33. Physical metallurgy of RSP microalloyed steels (Vander Sande, Cohen)
34. Oxidation resistance of RSP austenitic steels (Yurek)

64. McDonnell-Douglas Research Laboratories
P.O. Box 512
St. Louis, MO 63166
D.P. Ames (314) 232-3254
Programs:
1. Evaluation of RST alloys

65. McGill University
Ernest Rutherford Physics Building
3600 University Street
Montreal, PQ
Canada, H3A 2T8
Prof. J.O. Strom-Olsen (514) 392-4419
Prof. W.R. Muir (514) 392-4786
Prof. R. Harris (514) 392-4407
Prof. M. Zuckermann (514) 392-4787
Dr. Z. Altounian (514) 392-4412
Programs:
1. Stability of melt-spun amorphous metals.
2. Electron transport properties of amorphous metals, especially at low temperatures
3. Magnetic properties (including Mossbauer effect) of amorphous magnetic alloys
4. Structural modelling of amorphous systems

66. Michigan Technological University
Department of Metallurgical Engineering
Houghton, MI 49931
Prof. T.H. Courtney (906) 487-2036
Prof. R.W. Heckel (906) 487-2010
Prof. D.A. Koss (906) 487-2170
Prof. D.W. Smith (906) 487-2037
Programs:
1. Structure-property relationships in powder-fabricated metals and alloys (several programs)
2. Powder fabrication of alloys via homogenization processing (several alloy systems)
3. Fatigue and fracture phenomena in high-performance powder-fabricated alloys (to begin in the near future)
4. High-temperature oxidation and oxidation-resistant coatings (superalloys)

67. NASA Langley Research Center
   Materials Division
   Structures Directorate
   Hampton, VA 23665
   B. Liscor (804) 827-1110 x 3386
   Programs:
   1. Powder metallurgy aluminum alloys for structural application
   2. Thermo-mechanical processing of PM aluminum alloys

68. NASA Lewis Research Center
    Materials Division
    Cleveland, OH 44135
    H.B. Probst (216) 433-4000 x 6392
    Programs:
    1. Physical metallurgy of innovative alloy systems
    2. Evaluation of RST alloys in iron- and nickel-based systems

69. National Bureau of Standards (DOC)
    Materials Bldg.
    Washington, DC 20234
    Dr. J. Wachtman, Jr. Rm. B 308 (301) 921-2981
    Dr. R. R. Mehrabian Rm. B 266 (301) 921-2911
    Dr. J.W. Cahn Rm. A 153
    Programs:
    1. Production of well-characterized powders
    2. Characterization of rapidly solidified powders
    3. Phase diagrams of interest in RST
    4. Thermodynamics of solidification

70. Naval Air Development Center
    Aero Materials Laboratory (6063)
    Jacksonville and Street Roads
    Warminster, PA 18974
    Dr. G.J. London (215) 441-2808
    R.G. Mahorter (215) 441-2809
    Programs:
    1. Evaluation of RST alloys

71. Naval Research Laboratory
    4555 Overlook Avenue, S.W.
    Washington, DC 20375
    Dr. B. Rath (Code 6490) (202) 767-2465
    Programs:
    1. Acoustic damping alloys
    2. Wear-, corrosion-, erosion-resistant alloys
3. Superconducting composites

72. David Taylor Naval Ship Research & Development Center
Ship Materials Engineering Department
Annapolis, MD 21402
J.R. Belt (301) 267-2635
J.R. Crisci (301) 267-2462
B. Hammond (301) 267-3655
Programs:
1. Rapidly solidified alloys for corrosion resistance of machinery alloys

73. Naval Surface Weapons Center
R-32, Metallic Materials Branch
White Oak, MD 20910
A.P. Divecha (202) 394-2019
H. Dejarnette
Dr. L. Kabacoff
S.D. Karmakar
Programs:
1. Al-Li ingots via rapid crystallization under pressure
2. Al-Mg ingots via rapid crystallization under pressure
3. SiC whisker and SiC particle-reinforced aluminum alloy flakes and sheets via rapid-solidification and deformation processing
4. Amorphous ribbons via rapid solidification for magnetostrictive alloys

74. North Carolina State University
Raleigh, NC 27650
R.B. Benson, Jr. (919) 737-2377
P.A. Parrish
1. Enhanced corrosion resistance of metal surfaces by ion treatment

75. Northeastern University
Institute of Chemical Analysis
360 Huntington Avenue
Boston, MA 02115
Prof. B.C. Giessen (617) 437-2827
Programs:
1. Preparation and characterization of new metallic classes
2. Production and consolidation of experimental quantities of RST powders

76. Northrop Corporation
Aircraft Division (Rept. 3871/62)
3901 West Broadway
Hawthorne, CA 90250
Dr. G.R. Chanani (213) 970-4963
I. Telesman
Programs:
1. Development and processing of aluminum-lithium-base alloys using both rapid-solidification and ingot technology
2. Investigation of high-strength fatigue resistant P/M 7XXX and 2XXX aluminum alloys
3. Investigation of improved methods for consolidating rapidly solidified aluminum alloy powders
4. High-strength P/M aluminum mill products
5. Manufacturing process for the hot isostatic pressing of large titanium P/M shapes

77. Northwest Technical Industries, Inc.
547 Diamond Point Road
Sequim, WA 98382
Joseph R. Munn (206) 683-4167
Alan W. Hare
Programs:
1. Explosive compaction of rapidly solidified elemental and alloy (steel and aluminum) powders

78. Norton Company
Industrial Ceramics Division
1 New Bond Street
Worcester, MA 01606
M.L. Torti (617) 853-1000 x2092
Research Manager
Programs:
1. Technology monitoring in ceramics systems

79. Nuclear Metals Inc.
2229 Main Street
Concord, MA 01742
P. Loewenstein (617) 369-5410
Vice President & Technical Director
P.R. Roberts
Engineering Manager for Specialty Powders
Programs:
1. Production of powders of most metals and alloys by the rotating electrode process
2. Consolidation of powders by extrusion

80. Oak Ridge National Laboratory (DOE)
Metals and Ceramics Division
P.O. Box X
Oak Ridge, TN 37830
J.R. Weir, Jr. (615) 574-4065
C.C. Koch
A. Das Gupta
D.S. Easton
D.M. Kroener
Programs:
1. Amorphous superconductors
2. Stability of binary and ternary metallic classes
3. Preparation of amorphous materials by arc-hammer, melt spinning, and electron-beam vapor deposition

81. Oak Ridge National Laboratory
Solid State Division,
P.O. Box X
Oak Ridge, TN 37830
C.W. White (615) 574-6295
P.R. Appleton (615) 574-6283

Programs:
1. Pulsed laser annealing of ion-implanted materials
2. Non-equilibrium crystal growth phenomena
3. Ultra-rapid heating and cooling using Q-switched and mode-locked laser sources
4. Formation of supersaturated solid solutions by ion implantation and laser annealing
5. Metastable surface properties resulting from rapid solidification

82. Ohio State University
Metallurgical Engineering Department
Columbus, OH 43220
Prof. G.W. Powell (614) 422-6608
Prof. J.P. Hirth

Programs:
1. Mechanical properties of rapidly solidified powders of Fe-Al-Si alloys after compaction and extrusion
2. Oxidation resistance of rapidly solidified powders of Fe-Al-Si alloys after compaction and extrusion

83. Oregon Graduate Center
Department of Materials Science
19600 N.W. Walker Road
Beaverton, OR 97005
Dr. W.E. Wood (503) 645-1121

Programs:
1. Laser alloying of Fe surfaces
2. Analysis of microstructure and strengthening mechanisms

84. University of Pennsylvania
Department of Metallurgy
Philadelphia, PA 19104
Prof. T. Egami (215) 243-5000
Prof. W.R. Graham

Programs:
1. Research on RST alloys
A5. The Pennsylvania State University
Materials Research Laboratory
University Park, PA 16802
R. Messier (814) 865-3704
N.H. Macmillan (914) 863-0190
P. Roy (814) 865-3421
S.V. Krishnaswamy (914) 865-3704
Programs:
1. Explosive crystallization of tetrahedrally bonded amorphous semi-conductor films
2. Laser treatment of ceramics
3. Plasma-sprayed layers

1536 Highland Avenue
Duarte, CA 91010
J.F. Mahoney (213) 357-3201
Dr. Julius Perel
1. Development of a table top fine powder generator and film coater for materials science investigations

A7. University of Pittsburgh
Department of Metallurgy and Materials
Pittsburgh, PA 15260
Prof. F.S. Pettit (412) 624-4141
Programs:
1. Basic research in rapidly solidified alloys

A8. Polytechnic Institute of New York
Microwave Research Institute
Route 110
Farmingdale, NY 11735
Prof. W.T. Walter (516) 694-5500
Prof. M. Newstein
Dr. N. Solimene
Programs:
1. Reflectance changes of metals and semiconductors during laser irradiation
2. Laser interaction with metallic surfaces
3. Optical properties of metals during laser irradiation
4. High-power electromagnetic wave interaction with matter
5. Laser annealing of semiconductors

A9. Pratt and Whitney Aircraft Group
Commercial Products Division
400 Main Street
East Harford, CT 06108
Dr. M. Blackburn (203) 565-3185
C.C. Law (203) 344-5092
D.F. Paulonis (203) 565-4667
Programs:
1. Evaluation of RST alloys
2. Advanced high-temperature aluminum alloys development

90. **Pratt and Whitney Aircraft Group**
Government Products Division
P.O. Box 2691
West Palm Beach, FL 33402
Arthur R. Cox (305) 840-3234

Programs:
1. Solidification theory
2. Process development for rapid solidification
3. Metal working relationship to rapid solidification powders
4. Rapid solidification as a means to reduce strategic element usage
5. Rapid solidification alloys for jet engine turbine blades and vanes
6. Rapid solidification alloys for jet engine turbine discs
7. Rapid solidification of alloys for jet engine bearings
8. Rapid solidification aluminum alloy development
9. Rapid solidification high strength steel development
10. Rapid solidification corrosion-resistant steel development
11. Rapid solidification development for special-purpose steels and Ni alloys
12. Rapid solidification effects on corrosion of superalloys

91. **Purdue University**
Department of Materials Engineering
Lafayette, IN 47907
Prof. J. Radavich (317) 749-8111

Programs:
1. Research in RST alloys

92. **Rensselaer Polytechnic Institute**
Materials Engineering Department
Troy, NY 12181
Prof. M.E. Glicksman (518) 270-6372

Programs:
1. Solute redistribution during rapid solidification: fundamental studies of how rapid solidification influences microsegregation and homogeneity
2. Dendritic growth--kinetics and micromorphology: studies relating dendritic structures to processing variables--especially cooling rate, supercooling, branch spacing, growth speed--to materials parameters and alloy characteristics
93. Revere Research, Inc.
P.O. Box 1352
Edison, NJ
Dr. S. Shapiro (201) 225-2000
Programs:
1. High-pressure extrusion of powders

94. Reynolds Metals Company
Metallurgical Research Division
P.O. Box 27003
Richmond, VA 23226
B.F. Holcombe, Jr. (804) 788-7563
DOD Contracts
Dr. D.S. Thompson (804) 788-7404
Director Dept. Metallurgy
O.R. (Duke) Singleton (804) 788-7462
Program Manager, #1 below
Programs:
1. Manufacturing technology: high-strength, powder metallurgy mill products
2. Dispersion hardened P/M alloys
3. Aluminum matrix, P/M composites
4. Improved P/M billet production techniques

95. University of Rochester
Department of Mechanical and Aerospace Sciences
Rochester, NY 14627
Dr. J.C. Li (716) 275-4039
Programs:
1. Mechanical properties of amorphous metals

96. Rocketdyne
Division Of Rockwell International
6633 Canoga Avenue Mail Stop DA-92
Canoga Park, CA 91304
C.M. Moss (213) 884-3527
J.R. Lewis (213) 884-3527
Programs:
1. Injection-molding and sintering of rapidly solidified nickel-base superalloy powders

97. Rockwell International
Rocky Flats Plant
P.O. Box 464
Golden, CO 80401
R.R. Corle (303) 497-2577
Ms. C.L. Ferrera (303) 497-2148
Programs:
1. Rapid solidification of beryllium
98. Rockwell International Science Center
1049 Camino Dos Rios
Thousand Oaks, CA 91360
M. Mitchell
D. Gnanamuthu
(805) 498-4545 x 343

Programs:
1. Properties of materials produced by rapid solidification technology
2. Laser processing of materials using rapid solidification technology

99. SCM Corporation
11000 Cedar Avenue
Cleveland, OH 44106
C.I. Whitman/Director R&D (216) 344-8446
E. Klar/Manager-Particle Tech (216) 344-8496
K. Kulkarni/Manager-Ferrous Full (216) 344-8445

Programs:
1. Metallurgical structure control in atomization and consolidation

100. Sandia National Laboratories
P.O. Box 5800
Albuquerque, NM 87185
S. Thomas Picraux (505) 844-7681
Paul S. Peercy (505) 844-6076

Programs:
1. Pulsed electron beam annealing of metals and semiconductors
2. Swept line electron beam annealing of metals and semiconductors
3. Pulsed laser annealing of metals and semiconductors

101. Sandia National Laboratories
Materials Development Division 8312
Livermore, CA 94550
Dr. J.E. Smuderesky (415) 422-2910 x2476

Programs:
1. Evaluation of rapid solidification powder-making processes for JRK-75 and A-286
2. Effect of powder characteristics and consolidation parameters on the microstructure and properties of rapidly solidified steels
3. Characteristics of gas atomized Nitronic 40 stainless steel as a function of atomizing gas
4. Effect of composition and powder-making process on the properties of rapidly solidified powder processed maraging steels
5. Evaluation of rapid solidification processes for the production of powders of Incoloy 903
6. Hot isostatic pressing of rapidly solidified HP-9-4-20 steel powders

102. Sikorsky Aircraft
Transmission System Section
Stratford, CT 06602
J.G. Kish (203) 386-5391
Programs:
1. High-performance gears

103. University of Southern California
3551 University Avenue
Los Angeles, CA 90007
Prof. S.M. Copley (213) 741-6225
Dept. of Materials Science
Dr. M. Bass (213) 741-7994
Dept. of Physics
Programs:
1. Solidification of metallic melts produced by laser irradiation

104. Special Metals Corporation
Middle Settlement Road
New Hartford, NY 13413
J.W. Pridgeon (315) 798-2930
L.A. Jackman
W.J. Boesch
Programs:
1. Fine-grain ingots by vacuum arc remelting
2. Development of powder-making processes
3. Structure of rapidly solidified superalloys

105. Stanford University
Dept. of Materials Science and Engineering
Stanford, CA 94305
Prof. O.D. Sherby (415) 497-2300
Programs:
1. Specialty steels

106. Systems Research Laboratories, Inc.
2800 Indian Ripple Road
Dayton, OH 45440
R.E. Omlor
Programs:
1. Characterization of powders and foils

107. University of Toronto
Dept. of Metallurgy and Materials Science
Toronto, ON M5S 1A4, Canada
Prof. Y. Waseda
Prof. K.T. Aust
Programs:
1. Structure of rapidly quenched metals by x-ray and neutron diffraction
2. Chemical properties such as corrosion behavior of metallic glasses

108. TRW Equipment Group
TRW Incorporated
23555 Euclid Avenue
Cleveland, OH 44117
John A. Alexander (216) 383-3292
Programs:
1. Processing evaluation of RST alloys

109. United Technologies Research Center
Silver Lane
East Hartford, CT 06108
Dr. E.R. Thompson (203) 727-7344
Programs:
1. Laser and layerglaze processing and pertinent alloy development
2. Dynamic compaction of rapidly solidified alloys
3. Alloys for rapid solidification processing and consolidation techniques

110. Universal-Cyclops Specialty Steel Division
Research and Development Department
Mayer Street
Bridgeville, PA 15017
L.W. Lherbier (412) 221-8000 x 300
W.B. Kent (412) 221-8000 x 343
J.T. Cordy (412) 221-8000 x 366
Programs:
1. Rapidly solidified powder via gas atomization
2. Controlled rate solidification of specialty steel billets

111. Valimet, Inc.
P.O. Box 61A6
431 Sperry Road
Stockton, CA 95206
William K. Fortman, Pres. (209) 982-4870
Terry S. Ullman, Mgr. Special Alloys
Programs:
1. Helium-gas-atomized powder production
112. University of Virginia
Department of Materials Science
Thornton Hall
Charlottesville, VA 22901
Dr. L.B. Johnson, Jr. (804) 924-3264
Programs:
1. Dental materials applications

113. Western Electric Engineering Research Center
Laser Studies Group
P.O. Box 900
Princeton, NJ 08540
Dr. C.W. Draper (609) 639-2527
Programs:
1. The use of laser quenching of conventional alloys (mostly Cu-based) to produce metastable single-phase surfaces
2. The use of laser surface alloying to produce novel compositions in metals
3. Studies of the damage induced in single crystal metals by laser irradiation
4. Determination of the effects of items 1 through 3 on the surface sensitive behavior of metals
5. Studies of the redistribution of ion implants in metals by laser irradiation treatments

114. Westinghouse Electric Corp., R&D Center
1310 Beulah Road
Pittsburgh, PA 15235
Dr. F.E. Werner (412) 256-3556
Programs:
1. Evaluation of Allied Corp METGLAS alloys for 60 Hz transformers
2. Basic studies of crystallization and other phenomena

115. University of Wisconsin-Madison
Madison, WI 53706
J.H. Perepezko (608) 263-1678
Programs:
1. Solidification of highly undercooled liquid droplets
SECTION II. RESEARCH AND DEVELOPMENT SPONSORS

1S Air Force Wright Aeronautical Laboratories
Flight Dynamics Laboratory
Wright Patterson AFB
OH 45433
  F. Boensch (FIBAA) (513) 255-5006
  L.G. Kelly (FIBC) (513) 255-4030

2S Air Force Wright Aeronautical Laboratories
Materials Laboratory
Wright Patterson AFB
OH 45433
  Dr. H. Burte (/MLL) (513) 255-5348
  G. Eichelman (/MLLS) (513) 255-3839

3S Air Force Wright Aeronautical Laboratories
Propulsion Laboratory
Wright Patterson AFB
OH 45433
  R.E. Supp, (/PO) (513) 255-5334

4S Air Force Office of Scientific Research/NE
Bollino Air Force Base
Washington, DC 20332
  Dr. A.R. Rosenstein (202) 767-4931

5S Army Armament R&D Command
AARADCOM
Dover, NJ 07801
  Dr. J. Waldman (201) 328-5111
  Dr. S.J. Cytron (201) 328-5746

6S Army Materials and Mechanics Research Center
Watertown, MA 02172
  Dr. G.H. Bishop, Jr. (617) 923-3436
  Dr. S. Isserow, NSXMP-KA (617) 923-3504

7S Army Mobility Equipment R&D Command
MEPACOM
Fort Belvoir, VA 22060
  W.F. McGovern (703) 664-5459
17S Naval Air Systems Command  
Washington, DC 20361  
R. Schmidt (AIR-320) (202) 692-2515

18S Office of Naval Research  
800 N. Quincy Street  
Arlington, VA 22217  
Dr. D. Polk (471) (202) 696-4402

19S Naval Research Laboratory  
4555 Overlook Avenue, S.W.  
Washington, DC 20375  
Dr. B. Rath (6490) (202) 767-2465

20S Naval Sea Systems Command  
Washington, DC 20362  
Dr. H. Van der Veldt (SEA-05R15) (202) 697-2432  
M. Kinna (SEA-62R4) (202) 692-1685

21S Naval Surface Weapons Center  
White Oak  
Silver Spring, MD 20910  
Dr. S. Fishman (R-32) (202) 394-2724
Adler, R.P.I., GTE Laboratories, Inc. (43)
Ahmad, I., Army Armament R&D Command (11)
Ahrens, T.J., California Institute of Technology (24)
Alexander, J.A., TRW Incorporated (108)
Altounian, Z., McGill University (65)
Ames, D.P., McDonnell-Douglas Research Labs. (64)
Appleton, B.R., Oak Ridge National Lab. (81)
Arajs, S., Clarkson College of Technology (27)
Ashcroft, N.W., Cornell University (31)
Ast, D.G., Cornell University (31)
Aust, K.T., University of Toronto (107)
Baer, D.R., Battelle Pacific NW Lab. (16)
Bania, P.J., Avco Lycoming Division (14)
Barranco, J., Army Armament R&D Command (11)
Bass, M., University of Southern California (103)
Bates, W.F., Jr., Lockheed Georgia Co. (56)
Belt, R., David Taylor Naval Ship R&D Center (72)
Benson, R.B., Jr., North Carolina State University (74)
Billman, F.R., Alcoa Laboratories (4)
Bishop, G.H., Jr., Army Materials & Mechanics Research Center (68)
Blackburn, M., Pratt and Whitney Aircraft Group (89)
Boensh, F.D., Air Force Wright Aero Labs. (1, 1S)
Boesch, W.J., Special Metals Corporation (104)
Bramfitt, B.L., Bethlehem Steel Corporation (18)
Broverman, I., Kaiser Aluminum & Chemical Corp. (53)
Burte, H., Air Force Wright Aero Labs. (2, 2S)
Cahn, J.W., National Bureau of Standards (69)
Carbonara, R.S., Battelle Columbus Laboratories (15)
Cargill, G.S. III, International Business Machines (50)
Caton, R., Clarkson College of Technology (27)
Cebulak, W.S., Alcoa Laboratories (4)
Cline, C., Lawrence Livermore National Lab. (54)
Chanani, G.R., Northrop Corporation (76)
Chen, W.C., Ames Laboratory (5)
Chilton, J.M., Bethlehem Steel Corporation (18)
Cohen, M., Massachusetts Institute of Technology (63)
Copley, S.M., University of Southern California (103)
Cordy, J.T., Universal Cyclops Specialty Steel Division (110)
Corle, R.R., Rockwell International (97)
Cost, J.R., Los Alamos National Lab. (58)
Courtney, T.H., Michigan Technological University (66)
Cox, A.R., Pratt & Whitney Aircraft Group (90)
Cremens, W.S., Lockheed Georgia Company (56)
Crisci, J.R., D.T. Naval Ship R&D Center (72)
Cytron, S.J., Army Armament R&D Command (10, 58)
Dahlgren, S.D., Battelle Pacific NW Lab. (16)
Dardi, L.L., Howmet Turbine Components Corporation (47)
Das, K.B., The Boeing Company (19)
Das Gupta, A., Oak Ridge National Lab. (80)
Dassel, J.L., Kaiser Aluminum & Chemical Corp. (53)
Davis, L.A., Allied Chemical Corporation (3)
Decristofaro, N.J., Allied Chemical Corporation (3)
Dejarnette, H., Naval Surface Weapons Center (73)
Dickson, J., Allied Chemical Corporation (3)
Divecha, A.P., Naval Surface Weapons Center (73)
Dolowy, J.F., Jr., DWA Composite Specialties, Inc. (35)
Dorough, G., Lawrence Livermore National Lab. (54)
Dowagila, R., Argonne National Laboratory (6)
Draper, C.W. Western Electric Engineering Research Center (113)
Drucker, D.C., University of Illinois (48)
Dulis, F.J., Crucible Research Center (32)
Easter, D.S., Oak Ridge National Lab. (30)
Fgami, T., University of Pennsylvania (94)
Eichelman, G., Air Force Wright Aero Labs. (2, 78)
Elliott, R.O., Los Alamos National Lab. (58)
Perrera, C.L., Rockwell International (97)
Fiedler, L.J., Avco Lycoming Division (14)
Field, R.D., University of Illinois (48)
Fishman, S., Naval Surface Weapons Center (215)
Flemings, M.C., Massachusetts Institute of Technology (63)
Fortman, W.K., Valimet Inc. (111)
Fox, C.W., Homogeneous Metals, Inc. (46)
Freeman, W.R., Jr., Howmet Turbine Components Corporation (47)
Giessen, B.C., Northeastern University (75)
Glicksman, M.E., Rensselaer Polytechnic Institute (92)
Gnanamuthu, D., Rockwell International (98)
Gould, R.W., University of Florida (37)
Graham, H., Air Force Wright Aero Labs. (2)
Graham, W.R., University of Pennsylvania (84)
Grant, N.J., Massachusetts Institute of Technology (63)
Green, M.L., Bell Telephone Laboratories (17)
Greenfield, M., NASA Headquarters (138)
Hammond, B., D.T. Naval Ship R&D Center (72)
Hansen, R.S., Ames Laboratory (5)
Hare, A.W., Northwest Technical Industries, Inc. (77)
Harrigan, W.C., DWA Composite Specialties, Inc. (35)
Harris, R., McGill University (65)
Heckel, R.W., Michigan Technological University (66)
Hickl, A.J., Cabot Corporation (22)
Hirth, J.P., Ohio State University (82)
Holcombe, B.F., Jr., Reynolds Metals Company (94)
Holt, B., Lawrence Livermore National Lab. (54)
Hood, P.F., Exxon Enterprises (36)
Hsu, S.C., GTE Laboratories, Inc. (43)
Beiberow, S., Army Materials & Mechanics Research Center (12, 65)
Jackman, L.A., Special Metals Corporation (104)
Jackson, K.A., Bell Telephone Laboratories (17)
Jeanfils, C.L., Cabot Corporation (22)
Jing Gu Zhang, University of Connecticut (30)
Johnson, A.M., General Electric, Co. (39)
Johnson, H.H., Cornell University (31)
Johnson, L.A., General Electric, Company (40)
Johnson, L.B. Jr., University of Virginia (112)
Johnson, W.L., California Institute of Technology (24)
Kabacoff, L., Naval Surface Weapons Center (73)
Kaplow, R., Massachusetts Institute of Technology (63)
Karmaker, S.D., Naval Surface Weapons Center (73)
Kear, B.H., University of Connecticut/UTRC (30, 109)
Kearns, T.F., Institute for Defense Analyses (49)
Kelly, L.G., Air Force Wright Aero Labs (1, 15)
Kent, W.B., Universal Cyclops Specialty Steel Division (110)
Kinna, M., Naval Sea Systems Command (205)
Kish, J.G., Sikorsky Aircraft (102)
Klar, E., SCM Corporation (99)
Koch, C.C., Oak Ridge National Lab. (80)
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