



DSB Newsletter



May 2003

Dr. William Schneider, Jr., Chairman

Mr. Vince Vitto, Vice Chairman
Director

Mr. Brian Hughes, Executive

Chairman's Corner

I would like to welcome the following new members to the Defense Science Board:

Dr. Miriam John
Dr. Robert Lucky

GEN Jim McCarthy, USAF (Ret.)
GEN Mike Williams, USMC (Ret.)

I look forward to working closely with each of them in the days that lie ahead.

The 2003 Summer Studies are in full swing and pushing hard for the Irvine, CA outbrief. This year's topics are:

DoD Role in Homeland Defense:

Co-Chairs: ADM Don Pilling, USN (Ret.) and Mr. Don Latham

Future Strategic Strike Forces:

Co-Chairs: Mr. Vince Vitto and ADM Dennis Blair, USN (Ret.)

It is not too early to begin thinking of topics for the 2004 Summer Study effort. Make your suggestions to Brian Hughes.

Several Task Forces will start in the near future as some of the current Task Forces wrap up. As always your expertise and capabilities will be essential to the success of our Task Forces, and I hope you can contribute when called upon.

My thanks Phil Odeen who has agreed to chair the 2003 Fubini Award Selection Committee. All of us look forward to the results of the Committee's deliberations later this summer.

DSB MEETING DATES FOR 2003

- 4-15 August 2003 Summer Study Conclusion - Irvine, CA
- 22-23 October 2003 Fall Quarterly - Pentagon, Washington, DC

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Membership

The Board continues to actively solicit suggestions for highly qualified scientific and technical candidate members, with special emphasis on women and minority candidates. Prior Task Force participation offers an individual, OSD, and the Board an opportunity to determine a person's interest and suitability to Board activities and is a desirable prerequisite to membership on the Board. The roster of current Board members is included in this newsletter.

Staff Changes

Ms Patricia Shirley bid farewell to the DSB staff after 12 years. She accepted a new position (with a promotion) in Washington with the U.S. Courts training Federal judges.

Ms. Cheryl Navarro joined the DSB team from within AT&L as our new Executive Assistant. She leaves behind her duties on the Congressional liaison, GAO, IG and foreign scientist program. Please extend Cheryl a warm welcome.

Task Force Status

- **2003 Summer Study: DoD Role in Homeland Defense** (Co-Chairs: ADM Don Pilling, USN (Ret) and Mr. Don Latham) The study, co-sponsored by USD(AT&L), Assistant to the Secretary of Defense (Nuclear, Chemical, and Biological Defense Programs), Under Secretary of Defense (Policy), and Northern Command (NORTHCOM), is tasked to address the Department of Defense (DoD) roles and

missions in homeland security. **The task force is in progress.** (LTC Dolgoff)

- **2003 Summer Study: Future Strategic Strike Forces** (Co-Chairs: Mr Vince Vitto and ADM Dennis Blair, USN (Ret)) The study, co-sponsored by USD(AT&L) and the Director, Defense Systems will assess the future strategic strike force needs of the Department of Defense. **The task force is in progress.** (LtCol Basl)
- **Chemical Warfare Defense** (Co-chairs: Dr. George Whitesides & Dr. Regina Dugan) This study, co-sponsored by USD(AT&L) and DARPA, assessed the possibility of controlling the risk and consequences of a CW attack to acceptable levels within the next five years. **The Task Force is drafting a final report.** (LTC Dolgoff)
- **Training for Future Conflicts** (Co-chairs: Dr. Joe Braddock & Dr. Ralph Chatham) This study, co-sponsored by USD(AT&L) and Director for Readiness and Training in OUSD(P&R), is a follow-on to the January 2001 Training Superiority & Training Surprise report. Operating under a revised TOR with added emphasis on joint and interoperability training, the Task Force will identify and characterize the education and training requirements demanded by Joint Vision 2020. **The Final Report is under DSB Review.** (LtCol Basl)
- **Operation Enduring Freedom Lessons Learned** (Chair: Gen James McCarthy, USAF (Ret)) This study, co-sponsored by USD(AT&L), VCJS & CENTCOM, is

examining current activities of Operation Enduring Freedom to determine both near- and long-term technical and operational considerations that could be used to improve this operation and future campaigns initiated in the War Against Terrorism. **Phase III of the task force is in Final Draft. Phase IV is in progress.** (LTC Dolgoff)

- **Discriminant Use of Force** (Co-Chairs: Dr. Joshua Lederberg & Dr. Ted Gold) This study, co-sponsored by USD(AT&L) and the Director, Defense Systems, is conducting a comprehensive study of the ends and means of precision compellence, of the nuanced use of force, in concert with coalition partners, to achieve political, economic, etc., changes in countries affecting US interests. **Task Force is drafting a final report.** (LtCol Basl)
- **Intelligence in Support of the War Against Terrorism** (Co-Chairs: Dr. Joe Markowitz and ADM Bill Studeman (USN, Ret.)) This study, co-sponsored by USD(AT&L), the Assistant Secretary of Defense (Command, Control, Communication, and Intelligence), and the Director of Central Intelligence will identify capabilities, technologies and approaches for strengthening intelligence in support of the war against terrorism. **Final Report is in security review.** (CDR Waugh)
- **Role and Status of DoD Red Teaming Activities** (Co-Chairs: Dr. Ted Gold and Dr. Bob Hermann) This study, co-sponsored by USD(AT&L) and the Director, Defense Systems, will review the role and status of Red Teaming in the DoD and recommend ways to make it a more effective tool. **The Final Report is in Draft.** (LTC Dolgoff)
- **Defense Against Clandestine Nuclear Attack.** (Co-Chairs: Dr. William Graham and Dr. Richard Wagner) This study, co-sponsored by USD(AT&L) and the Assistant to the Secretary of Defense (Nuclear and Chemical and Biological Defense Programs), will assess the adequacy of the U.S. ability to detect, identify, respond, and prevent unconventional nuclear attacks by terrorist or sub-national entities. **The Final Report is in Draft.** (LTC Dolgoff)
- **Wideband RF Systems** (Chairman: Dr. Gary Minden) This study, co-sponsored by USD(AT&L) and ASD(C3I), will review and advise on key aspects of the policy and technology issues associated with the military applications of Wideband RF systems. **Final Report is in security review.** (LtCol Basl)
- **Interference Capabilities** (Chairman: Mr. Peter Marino) This task force, co-sponsored by USD (AT&L), The Director of Central Intelligence, and the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), is tasked to identify any potentially high-payoff and high-threat capabilities and understand the impact of any new capability on current and future systems. The Task Force should strive to understand the phenomenology of any proposed capability. **The Final Report is in Draft.** (CDR Waugh)
- **Unmanned Aerial Vehicles (UAVs) and Uninhabited Combat Aerial Vehicles (UCAVs)** (Co-Chairs: MGEN Ken Israel, USAF (Ret) and Mr. Bob Nesbit) This task force, co-sponsored by USD (AT&L), the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Director, Strategic and Tactical Systems, is tasked to conduct a comprehensive review of the Department's plans for development and fielding of UAV and UCAV systems. **The Task Force is in progress.** (CDR Waugh)
- **DSB/AFSAB Joint Task Force on Acquisition of National Security Space Programs** (Chairman: Mr. A. Thomas Young) This Task Force, co-sponsored by USD (AT&L) and the Secretary of the Air Force, directs the Defense Science Board, in conjunction with the Air Force Scientific Advisory Board, to review the acquisition of National Security Space Programs and to make recommendations to improve the acquisition of space programs from their initiation to deployment. **The Task Force is drafting a final report.** (LtCol Basl)
- **Seabasing** (Co-Chairs: Dr. Bill Howard and ADM Don Pilling, USN (Ret)) This Task

Force, co-sponsored by USD (AT&L), the Secretary of the Navy, and the Director, Defense Systems, is tasked to assess how seabasing of expeditionary forces can best serve the nation's defense needs through at least the first half of the 21st century. **The Task Force is in progress.** (CDR Waugh)

- **Unexploded Ordnance - UXO** (Co Chairs: Dr. Delores Etter and Mr. Bill Delaney) This study, co-sponsored by USD(AT&L) and the Deputy Under Secretary of Defense (Installations and Environment), is chartered to address ways to reduce the extremely high cost of UXO clean up and identify technologies to help minimize the environmental impact of continued live-fire training and testing. **The Task Force is in progress.** (LTC Dolgoff)
- **Smallpox Vaccine Down Select** (Chairman: Dr. George Poste) This Task Force, co-sponsored by USD (AT&L) and the Assistant to the Secretary of Defense (Nuclear and Chemical and Biological Defense Programs), is tasked to perform an independent evaluation of the Department of Defense and Department of Health and Human Services smallpox vaccine candidates. **The Task Force is in progress.** (CDR Waugh)
- **Exploiting Technology to Transform Military Manpower** (Co-Chairs: Mr. Michael Bayer and Dr. Jim Wade) This Task Force, co-sponsored by USD (AT&L) and the Director of Defense Research and Engineering, is tasked to identify technology options that will reduce military manpower burden of asynchronous threat operations at home and abroad, and recommend a strategic approach to transforming military manpower beginning with the Force Protection mission. **The Task Force is in progress.** (LtCol Basl)
- **Joint Experimentation** (Chairman: Dr Ted Gold) This Task Force, co-sponsored by USD (AT&L) and the Commander, United States Joint Forces Command, is tasked to examine joint experimentation programs and activities and to recommend ways to enhance the contributions of joint experimentation to

transformation. **The Task Force is in progress.** (LTC Dolgoff)

- **Managing Foreign Intelligence by Focusing on Ends vice Means** (Co-Chairs: Dr. Craig Fields and Dr. Joe Markowitz) This study, co-sponsored by USD(AT&L) and the Assistant Secretary of Defense (C3I), will address alternative ways of managing US foreign intelligence endeavors in support of national security, by focusing not on the means by which intelligence information is collected, but rather the ends it is to serve. **The Task Force is in progress.** (CDR Waugh)
- **Missile Defense Phase III (Modeling and Simulation)** (Co-Chairs: Gen Larry Welch (USAF, Ret) and Dr. William Graham) This study, co-sponsored by USD(AT&L) and the Missile Defense Agency (MDA), will assess the scope of the modeling and simulation effort, the fidelity and validity of simulations, and additional opportunities for M&S contribution to BMDS development and evaluation. **The Task Force is in progress.** (LtCol Basl)
- **Enabling Joint Force Capabilities** (Co Chairs: Gen Larry Welch (USAF, Ret) and Dr. Bob Hermann) This study, co-sponsored by USD(AT&L) and the Chairman, Joint Chiefs of Staff, is chartered to review and understand the current state of assigned responsibilities and accountability for joint capabilities, identify unfilled needs and areas, and recommend further steps to strengthen the joint structure's ability to quickly integrate service-provided force capabilities. **The Task Force is in progress.** (LTC Dolgoff)

DSB Reports published since January 2003:

- **2002 Summer Study: Special Operations and Joint Forces in Support of Countering Terrorism (January 2003)**
Report Summary (Unclass) and Main Report (Classified)
- **B-52H Re-Engining (Jan 2003)**

Army Science Board (ASB)

Dr. Joe Braddock – Chairman

Dr. James Tegnalia – Vice Chairman

COL Jeff Willey - Executive Secretary

MAJ Bob Grier - Executive Officer

FY03 Overarching Studies

Each of our two study groups held plenary meetings in March and final plenary meetings in May. We will brief the results of both these studies to the Senior Army Leadership at the University of California, Irvine Beckman Center on 24 July, 2003.

Force Protection Technologies for the 2010-2020 Timeframe. (Co-chaired by Mr. Gilbert Herrera, Mr. Frank Kendall, and Dr. Marygail Brauner). The study is organized into six panels: **Research and Past Works Review** chaired by Dr. Robbi Perna, **Vulnerability and Threat Assessment/Intelligence Requirements** chaired by Dr. Tony Hyder, **Operations** chaired by GEN David Maddox (USA, Retired), **Technology Solutions** co-chaired by Dr. Ed Brady and Dr. Peter Swan, **Analysis and Modeling** chaired by Dr. Stuart Starr, and **Interfaces with Local Governments, Commerce and Infrastructures** chaired by Mr. Alan Schwartz. As the title implies, the study will assess threats to the force in the 2010-2020 timeframe and suggest technologies that hold promise for addressing those threats.

Challenges and Opportunities in Developing the Block II and Block III Future Combat System (FCS) (Co-chaired by Dr. Frank Akers, Dr. Warren Morrison, and Dr. Bob Douglas). This study is organized into five panels: **Architecture and Information Integrity** co-chaired by LTG Bill Campbell (USA, Retired) and Dr. Peter Lee, **Sensor Quality and Integrity** co-chaired by Dr. Jasper Lupo and Dr. Ed Reedy, **Platforms and Weapons** chaired by Mr. Dennis Carlson, **Operational Performance Assurance** chaired by LTG Butch Funk (USA, Retired), and **Technical and Operational Red Teaming** chaired by Mr. Neale Cosby. The study will focus on identifying promising technologies to improve the lethality of weapons and achieve high survivability of soldiers and platforms. We were asked to suggest technology insertion priorities and assess technical and integration risks affecting

the accelerated transition of technology into the FCS. The study will examine information management challenges resulting from the expansion of C4ISR capabilities that leverage future sensors, processors, and novel platforms and the difficult task of automating sensor and data fusion for large numbers of sensors to enable: automated target weapon pairing, augmented soldier-in-the-loop decision-making.

Special Studies

- **Aviation Study** (Co-chaired by Mr. Edward Brady and Mr. Ira Kuhn) This study examined roles and missions for both manned and unmanned aerial vehicles in the Objective Force. Sub topics include arming unmanned systems, teaming manned and unmanned systems, applications for unmanned systems in combat support and service support roles, and air-to-air combat applications. This study concluded in December and is being briefed back to the sponsors and Senior Army and OSD Leadership.
- **Advanced Antenna Technologies for the Objective Force.**(Co-Chaired by Dr. Phil Dickinson and Mr. Kalle Kontson) Within the Objective Force operational tasks are condensed and communications requirements are increased, driving the need for integration and consolidation. We are asked to determine possible solutions for multifunctional antennas capable of servicing a number of different transmitters and receivers operating in a myriad of frequency bands. This study is closely linked with our FCS Summer Study.

For more information on the ASB visit:
<https://webportal.saalt.army.mil/SARD-ASB/default.htm>

Naval Research Advisory Committee (NRAC)

Mr. John M. “Jack” Bachkosky – Chair
Dr. Robert C. Spindel – Vice-Chair
CAPT Dennis L. Ryan, III USN (Ret.) - Program Director

The NRAC held its Winter Meeting from 10 to 14 March in Seattle, Washington. The primary focus of the meeting was to gain a current

appreciation of the problems facing today's operating forces. Visits to the USS Michigan (SSBN-727), USS Ford (FFG-54), Patrol and Reconnaissance Wing 10 and Electronic Attack Wing, U.S. Pacific Fleet gave a broad yet comprehensive update to current operational concerns. Additionally, NRAC was able to visit with Microsoft Corp. and Boeing, where discussions on several areas of advanced and innovative technology were discussed.

Current Studies:

Transformational Opportunities for Naval Utilization of Space This study has been combined with a new study on FORCEnet and is no longer being pursued as a separate topic.

2003 Summer Study The study topics for the FY 2003 Summer Studies are **Science and Technology in FORCEnet** and **Technology Acquisition Reform**.

Science and Technology in FORCEnet This study is chaired by Mr. Joseph Y. Rodriguez and co-chaired by Ms. Teresa Smith. The purpose of the study is to define the concepts and science and technology (S&T) initiatives, including those in the space, atmospheric, surface and subsurface environments, required to achieve the visions of FORCEnet and Sea Power 21.

Some of the important technical issues for FORCEnet include:

- Communications; dynamic bandwidth management (i.e., bandwidth on demand with no restrictions), gigabit per second data transfers, assured IP, user addressing, and the total communications system (within FORCEnet) including the utilization and integration of both internal and external systems, and the transition from legacy to the future Transformational Communications Architecture.
- Battlespace Characterization; enabling the "4D Cube," global and continuous monitoring of Meteorological and Oceanographic (METOC) conditions, and deployed sensor data retrieval.
- Intelligence, Surveillance, and Reconnaissance (ISR); persistent ISR, sensor netting, and fused sensor data in real time.
- Position, Navigation, and Timing (PNT); time transfer and synchronization, transition to

electronic charting, and an alternative to GPS.

- Space Control; new technologies in the function areas of prevention (i.e., preventing others from using our space assets), protection (i.e., protecting our space assets from man-made and naturally occurring effects), negation (negating other's satellites through denial, deception, degradation, and destruction), and the surveillance of space.

The study will clearly define the Department of the Navy's current S&T supporting FORCEnet, including space sensors and capabilities, and identify the most critical areas for future Navy investment. It should identify which S&T initiatives are required and the additional options for how Navy's S&T capabilities should be leveraged to meet Naval requirements of FORCEnet. These include, but are not limited to:

- Benchmarking current S&T in support of FORCEnet.
- Identifying the S&T required to enable and optimize FORCEnet and the Navy's ability to use National Security Space.
- Providing a roadmap (with candidate performers) to ensure accomplishment of the S&T goals.

Technology Acquisition Reform This study is chaired by Mr. Mark Lister and co-chaired by Mr. Richard Rumpf. The purpose of the study is to recommend alternative approaches to technology acquisition that could be implemented within the Department of the Navy's acquisition system.

The acquisition system used by the Department of the Navy (DON) to procure new systems including software and material is mandated by the Department of Defense (DoD). It is an industrial age system being employed in an information age. The goal of the acquisition system is to ensure that DON personnel have the best and most reliable state of the practice hardware and software available to accomplish assigned missions. Because of the complexity of modern day warfare, rate of change of technology, bottom line emphasis by commercial business, as well as regulatory restrictions both internal and external to the DoD, the acquisition system has become cumbersome and excessive.

In addition to being cumbersome the cost of administration of the acquisition system is of major concern both for government and industry

alike. As a result of the cost and complexity of maintaining a unique DoD acquisition system, there are commercial companies who will not seek defense contracts. This has the potential of denying the latest technology to operational forces.

Furthermore, the cost of administration has to be measured in the currency of both money and time. The Milestone Decision Authorities must spend considerable time reviewing the necessary information and documentation to ensure that the acquisition decisions are compliant to regulations. In many cases the reviews are quickly rendered useless by changes in a program, which requires new documentation.

Finally, the Chief of Naval Operations has promulgated the strategy of Seapower 21. One of tenants of Seapower 21 is to speed development of new concepts and technologies. In order for those new concepts and technologies to quickly reach the intended operating forces there must be streamlined procedures that facilitate rapid implementation.

This NRAC study will examine current approaches to managing DON acquisition programs with a particular emphasis on technology acquisition. This study will also examine alternative approaches tested by other departments, agencies, and countries. Specifically, this NRAC study will:

- Review examples of new, emerging, and experimental technology acquisition. For example, NMCI lessons learned, CTTO lessons learned, In-Q-Tel, Army venture fund, DoD and Navy venture fund plans, UK R&D privatization.
- Investigate acquisition alternatives studied by ATL, and others.
- Recommend procedures and opportunities to streamline and improve technology acquisition subject to regulatory restrictions.

For more information on NRAC activities visit <http://nrac.onr.navy.mil/webspace>

Air Force Scientific Advisory Board (SAB)

Dr. Daniel E. Hastings - Chair

Dr. Ronald P. Fuchs - Vice Chair

Lt Gen John D.W. Corley - Military Director

Col Charles D. Bowker - Executive Director

Spring Board Meeting 2003

This year's annual Spring General Board Meeting was held at Eglin AFB from 14 – 18 April. Members toured Eglin's Readiness Center & King Hangar, and were briefed by the AAC/CC, and various AFRL, AFSOC, and AAC components. Members also met by study committee – *Unmanned Aerial Vehicles in Perspective: Effects, Capabilities, and Technologies; CONOPS and Technology to Support Long-Range Strike Operations; and Technology for ISR Machine to Machine Integration* – to receive further briefs and collect data.

Study committees are continuing to receive briefs from AF and DoD components, FFRDCs, and defense industry corporations. The Board will next meet in its entirety at the Beckman Center in Irvine, CA this summer.

Science & Technology Quality Reviews

AFOSR will be reviewed from 25 - 30 August 03. The FY'04 Science & Technology Quality Review Kickoff meeting will be held 29-30 September 03.

Publishing Status

The following study is awaiting security and publication clearance from OSD and the Air Staff:

- Subsequent volumes of *Sensor Technology for Difficult Targets*

The following study is at the printer/publisher:

- *Air Force Command and Control: The Path Ahead*

The following studies are in distribution:

- *Immediate Attack in Deep and Hostile Territory*
- *Predictive Battlespace Awareness to Improve Military Effectiveness, Volume 2*

Calendar of Upcoming SAB Events

Summer Session

15 – 27 June 03, Beckman Center, Irvine, CA

Science & Technology Quality Review - AFOSR

25 - 30 August 03, AFOSR, Rosslyn, VA

Science & Technology Quality Review Kickoff

29 - 30 September 03, National Academy of Sciences Center, Woods Hole, MA

Fall General Board Meeting

8 -9 October 03, SAFTAS Conference and Innovation Center, Rosslyn, VA

To request further information or submit comments email Paul.Hazell@Pentagon.AF.mil

DIA Advisory Board

Dr. Michael Wartell – Chairman
Mr. Lawrence Carnegie, Program Manager & Executive Secretary

The new DIA Advisory Board is reorienting, reorganizing, and relocating. The board has revised its charter and will be adding new members with expertise in homeland security; regional and cultural studies; information technology and management; human resources; and financial management. The Board's array of specialized disciplines provides innovative

perspectives on operational and managerial efforts in the commercial sector as well as other government organizations. Several Board panels are presently in various stages of working four defense intelligence priorities: Measurement and Signature Intelligence technology transition; defense intelligence transformation; use of performance metrics; and work force planning. In addition, the DIA leadership is evaluating additional intelligence priorities for the Board. Finally, the Board has relocated from the Defense Intelligence Analysis Center to the Pentagon.

Defense Science Board Active Task Forces

Green – Army Mil Assist

Light Blue – Air Force Mil Assist

Dark Blue – Navy Mil Assist

ID	Task Force	TOR Date	Finish	Nov '02	Dec '02	Jan '03	Feb '03	Mar '03	Apr '03	May '03	Jun '03	Jul '03	Aug '03	Sep '03	Oct '03
2	TRAINING F														
Defense Science Board Members and Ex Officio															
4	CHEMICAL WARFARE DEFENSE														
6	ENDURING FREEDOM LESSONS LEARNED	12/14/01	5/30/03	Phase II/III Final Draft/Phase IV in Progress											
8	DISCRIMINANT USE OF FORCE	12/26/01	12/11/02	Final Report in Draft											
10	INTELLIGENCE IN SUPPORT OF WAR AGAINST TERRORISM	1/10/02	12/9/02	Final Report in Security Review											
12	ROLE AND STATUS OF DOD RED TEAMING ACTIVITIES	2/14/02	11/29/02	Final Report in Draft											
14	DEFENSE AGAINST CLANDESTINE NUCLEAR ATTACK	4/9/02	12/31/02	Final Report in Draft											
16	WIDEBAND RF SYSTEMS	5/9/02	12/30/02	Final Report in Security Review											
18	INTERFERENCE CAPABILITIES	6/26/02	10/31/02	Final Report in Draft											
20	UNMANNED AERIAL VEHICLES & UNINHABITED COMBAT AERIAL VEHICLE	7/15/02	6/30/03	Final Report In Draft											
22	ACQUISITION OF NATIONAL SECURITY SPACE PROGRAMS	8/2/02	2/28/03	Final Report In Draft											
24	SEABASING	9/4/02	6/30/03	Final Report In Draft											
26	UNEXPLODED ORDNANCE	9/26/02	7/28/03	In Progress											
28	SMALLPOX VACCINE DOWNSELECT	10/2/02	7/28/03	In Progress											
30	EXPLOITING TECHNOLOGY TO TRANSFORM MILITARY MANPOWER	10/4/02	6/30/03	In Progress											
32	JOINT EXPERIMENTATION	10/10/02	3/28/03	Final Report in Draft											
34	INTELLIGENCE ENDS VICE MEANS	12/19/02	10/17/03	In Progress											
36	MISSILE DEFENSE PHASE III (MODELING & SIMULATION)	1/30/03	9/30/03	In Progress											
38	ENABLING JOINT FORCE CAPABILITIES	2/3/03	12/19/03	In Progress											
40	2003 SS: DoD ROLE IN HOMELAND DEFENSE	1/3/03	11/20/03	In Progress											
42	2003 SS: FUTURE STRATEGIC STRIKE FORCES	1/31/03	11/20/03	In Progress											

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