NATO Maritime Capabilities Group 6
USA Participation
Presentation to SNAME SD-5

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NAVSEA05D

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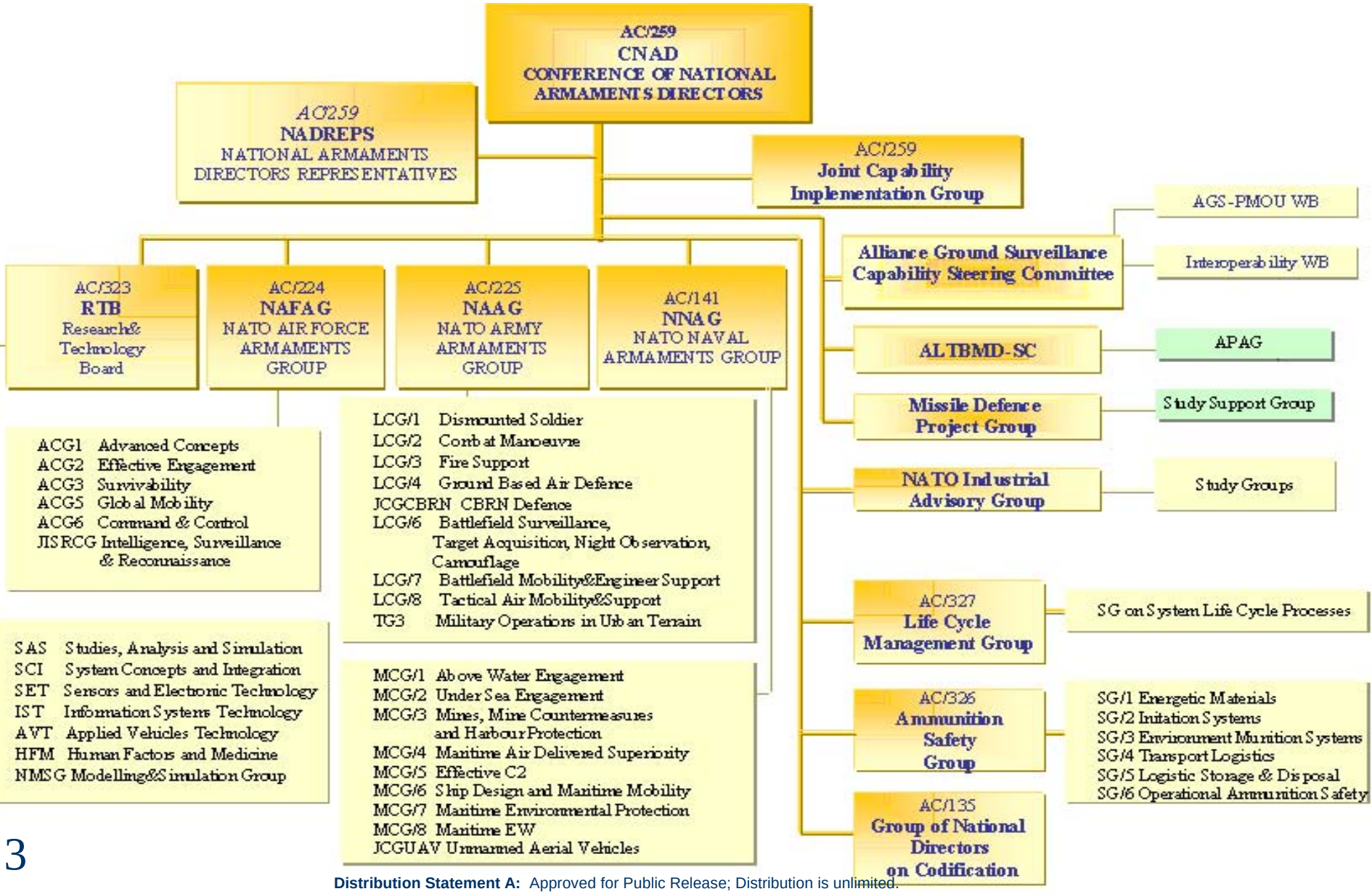
Agenda

- NATO Organization
- USA Engagement
- International Exchange Agreements/Data Exchange Agreements
  - NATO Members
  - Partner for Peace nations
- Cooperative Research

CNAD Organization Chart



Naval Group 6

15 NATO Members

Belgium Canada Denmark France Germany Greece Italy Netherlands Norway

Poland Portugal Spain Turkey UK US

8 Participating Partners

Australia Bulgaria Finland Latvia Romania Russia Sweden Ukraine

CNAD Major Programs

Alliance Ground Surveillance (AGS)

Missile Defence / Active Layered Theatre Missile Defence

Defence Against Terrorism Program of Work (10 areas)

Main Armaments Groups Management Plans Implementation

Life Cycle Management (AC/327)

Ammunition Safety (AC/326)

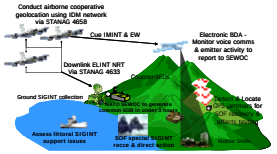
NIAG & RTO Studies

STANAGs & APs Development

Maintaining 318 STANAGs and 80 APs

31 STANAGs/APs under development

STANAGs Evaluation / Validation through trials & demos



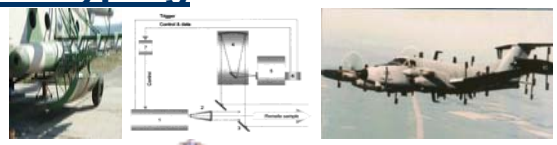
Trial Spartan Hammer 2006
NAFAG SIGINT/ESM WG

(November 2006 – Andravida, Greece)

Working with Industry

Engineering Publications

Prototyping



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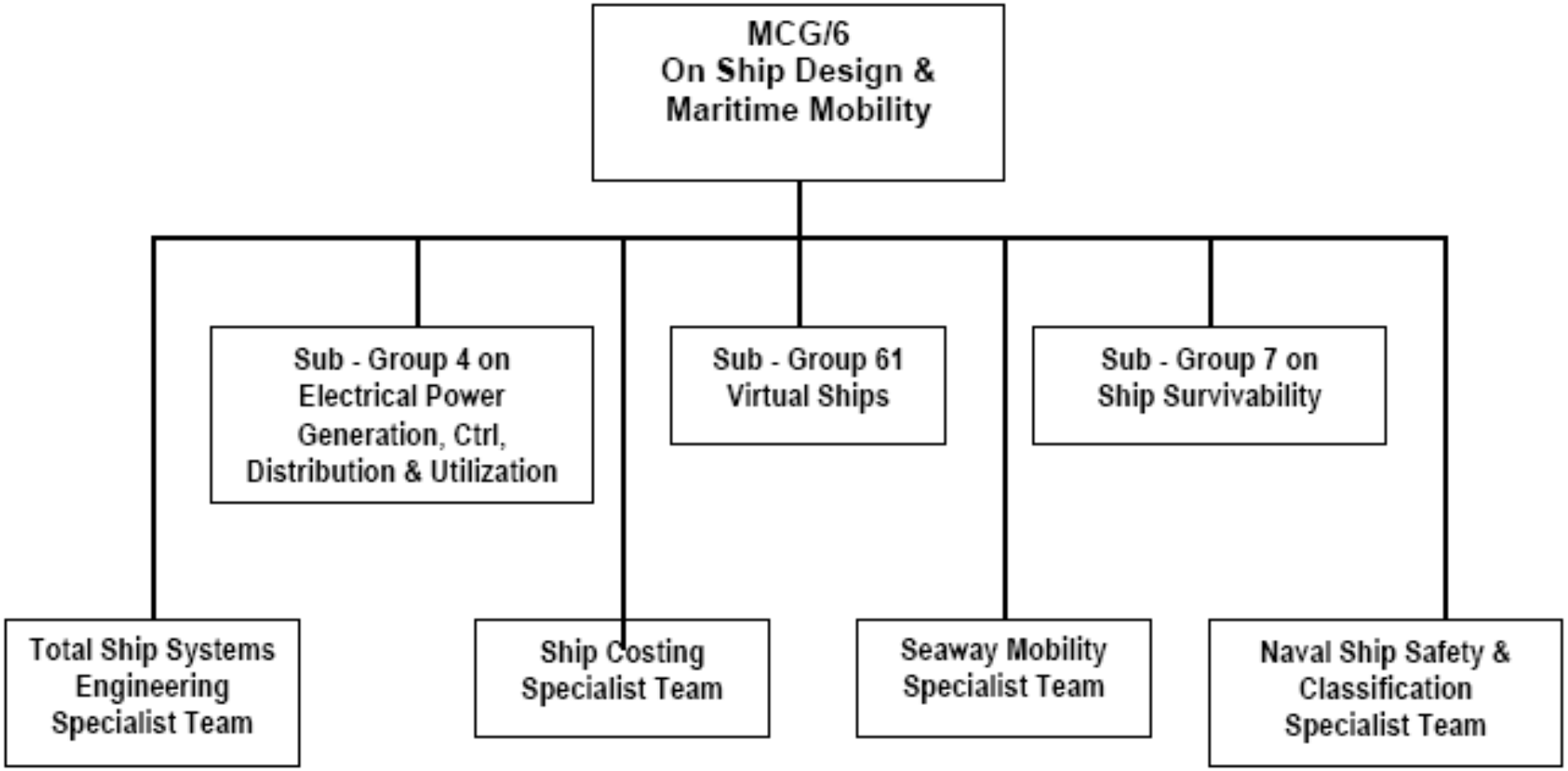
Maritime Capability Group 6 Organization

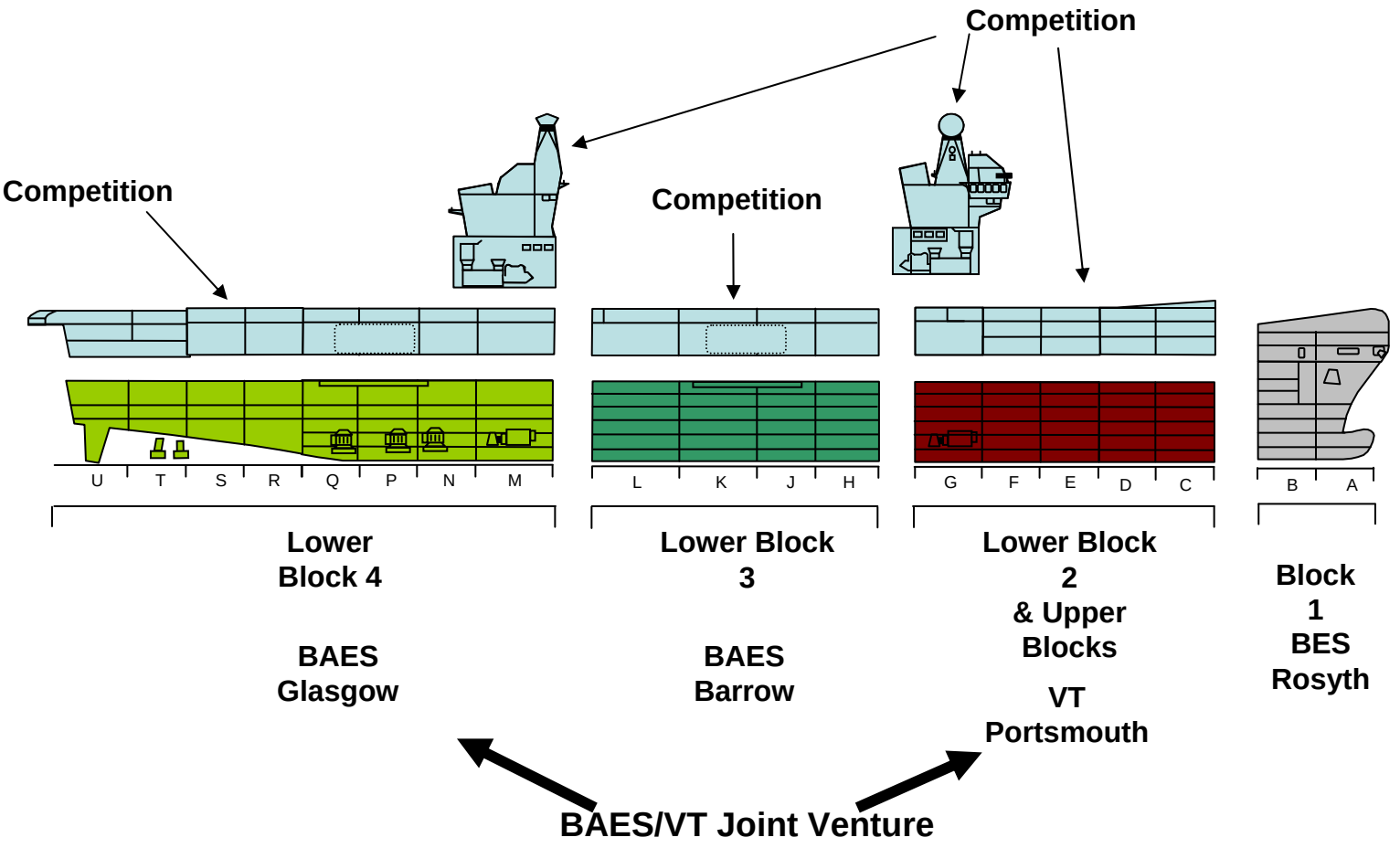


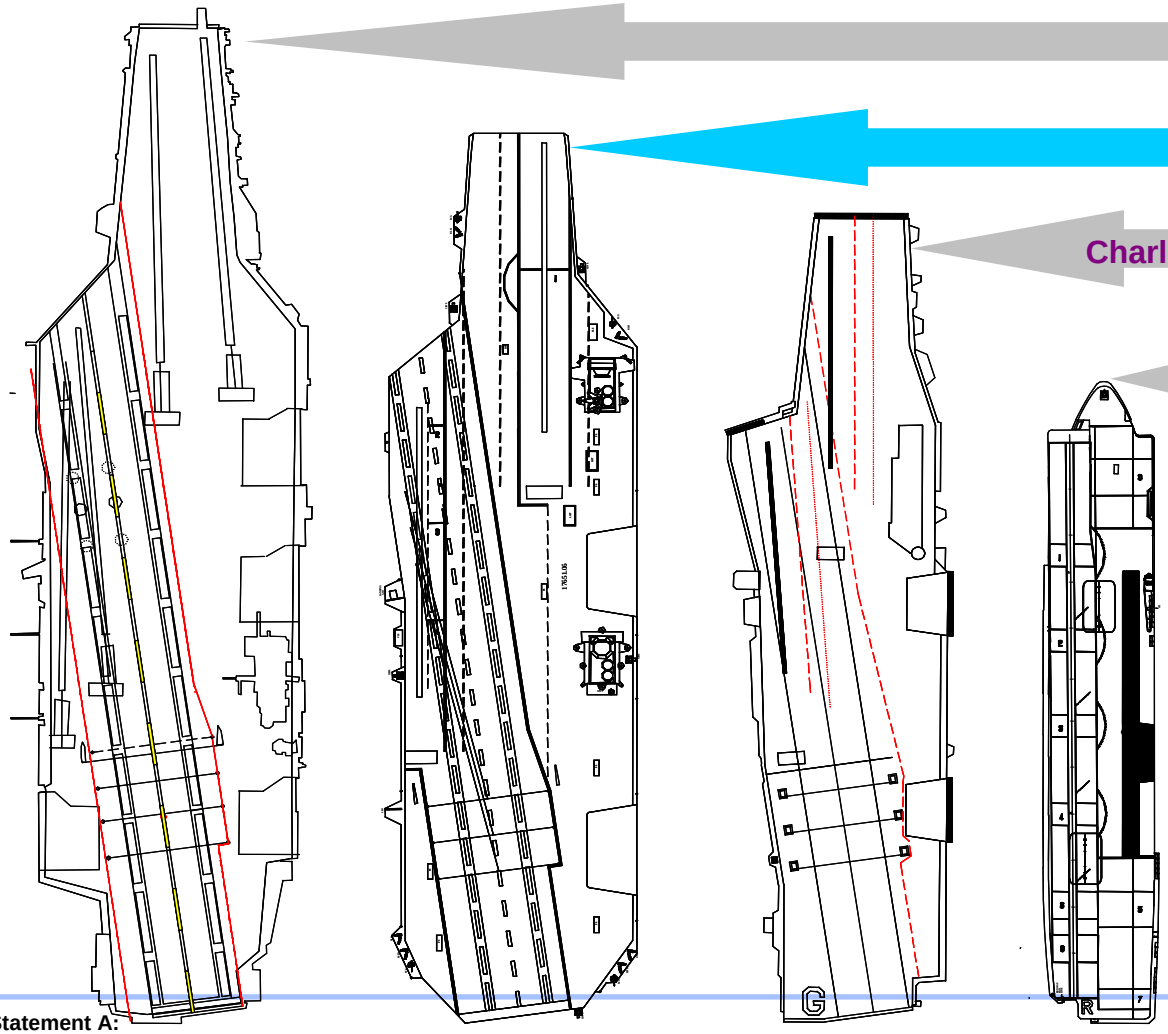
NATO TRENDS

- Joint Support Ships
- Amphibious (LPD)
- OPVs
- Naval Vessel Rules
- Joint Organizations
- Offshore procurements

New Developments - Examples

- UK-FR CVF
- UK – Type 45
- GER – F125 Corvette
- ITS CAVOUR - Aircraft carrier
- ITS DORIA - Horizon class
- FR – Horizon Class
- CAN – Future Surface Combatant
- AUS – Air Warfare Destroyer
- USA – SSC, JHSV





Nimitz Class – USA – 90,000 tonnes

CVF (CV) – UK – 65,600 tonnes

Charles de Gaulle – France – 45,000 tonnes

Invincible Class – UK – 20,000 tonnes

Carrier	Aircraft
Nimitz	90
CVF	40
CdeG	40
Invincible	22

HMS Darling

ITS CAVOUR

Germany - F 125

JHSV Material Solution: Phase I Award - Bollinger

Shipbuilder: BOLLINGER / INCAT USA Partnership

Military Concept Aluminum Catamaran

(HSV-like Based off 112 meter design)

Parent Company (INCAT Australia) Build:

TSV – 1X Spearhead

HSV – 2 Swift

HSV – 1X Joint Venture

Source of Information: INCAT Website - Not Official

JHSV Material Solution: Phase I Award - BIW

Shipbuilder: General Dynamics- BATH IRON WORKS / Rolls-Royce

Parent Vessel Characteristics

Length Overall 121.00 m
Length Between P.P. 118.00 m
Beam 19.00m
Design Draft 3.15m
Service Speed 40 knots
Endurance 4,700 nm

Additional Characteristics

Aviation Capable

Steel Monohull

Stern Ramp

Accommodation

4 officers, 28 crew and 350 troops

Source of Information: BIW / RR Websites - Not Official

JHSV Material Solution: Phase I Award – Austal USA

Shipbuilder: Austal USA

Parent Company (Austal Australia) is the Builder of the West PAC Express

- **Vessel Characteristics Not Supplied**
- **Picture of 102 M HSSV Design Concept on Austal's Website**

Multi-purpose operational roles:

Amphibious assault support
Rapid personnel deployment
Helicopter support
Search and rescue
Command and rescue
Humanitarian relief operations
Deployment of police and customs teams

Source of Information: Austal Website - Not Official

MCG/6 US Delegation STANAGs and ANEPs

- SG/61
  - Draft STANAG 4684 on Standards for Virtual Ships
  - ANEP 61 Guidance for Virtual Ship Distributed Simulation
- SG/4
  - STANAG 1008 Ed 9 on Characteristics of Shipboard Low Voltage Electrical Power Systems in Warships of the NATO Navies
  - STANAG 4390 Ed 1 on Tests and Requirements For Submarine Main Lead Acid Batteries
  - STANAG 4143 Ed 1 on Ship/Shore Connection Terminals for 3-Phase AC Power
  - STANAG 4287 Ed1 on Electrolyte for Main Lead Acid Batteries of Submarines
  - ANEP 44 on Compendium of Information on Electrical Power Generation and Distribution Practices of NATO Navies

MCG/6 US Delegation STANAGs and ANEPs

- SG/7
  - STANAG 4137 Ed 2 on Standard Underwater Explosion Test for Operational Surface Ships and Crafts (Classified)
  - STANAG 4549 Ed 1 on Testing of Surface Ship Equipment on Shock Testing Machines
  - STANAG 4142 Ed 2 on Shock Resistance Analysis of Equipment for Surface Ships
  - STANAG 1169 Ed 1 on Firefighting Equipment and Principles for Harmonization of Present and Future Equipment and Materials
  - STANAG 4141– Shock Testing of Equipment for Surface Ships
  - STANAG 4150 - Shock Testing of Heavyweight Surface Ship Equipment in Floating Shock Vehicles
  - ANEP 43 Ed 2 on Ship Combat Survivability (Classified)
  - ANEP 76 Ed 1 on Countering the Asymmetric Threat – A Guide for Warship Designers (Classified)
  - ANEP 60 –Guidance Document for the Planning and Execution of a Safe and Effective Whipping Trial (Classified)
  - ANEP 63 – Shock Mount Characterisation
  - ANEP 69 –Guidance To Naval Ship Designers On Analysis And Methods For The Hardening Of Topside Antennas Against Blast And Fragments (Restricted)
- ST-Cost
  - ANEP-41 Ed. 4 on Ship Costing
  - ANEP-49 Ed. 2 on Ways to Reduce Cost of Ships

MCG/6 US Delegation STANAGs and ANEPs

- ST-Mobility
  - STANAG 4154 Ed. 3 on Common Procedures for Seakeeping in the Ship Design Process
  - ANEP-46 Ed. 1 on List of References on Seakeeping Performance Assessment
  - ANEP-70 Ed. 1 on Guidance for Naval Surface Ships Mission Oriented Manoeuvring Requirements
  - ANEP-79 on Controllability and related Safety Issues for Naval Surface Ships
  - ANEP-78 on Naval Surface Ships Mission Oriented Manoeuvring Requirements Specification and Verification Templates
- Naval Ship Safety Code
  - Draft ANEP 77 on Naval Ship Safety Code

MCG/6 US Delegation STANAGs and ANEPs

- Sub-Rescue
  - STANAG 1074 on Minimum Standard Characteristics of Underwater Telephones for use in Submarines, Surface Ships and Helicopters of NATO
  - STANAG 1297 on Requirements for a NATO Common Rescue Seat
  - STANAG 1298 on Minimum Requirements for the Provision of Devices in the Distressed Submarine to assist location by Rescue Forces and Characteristics of Submarine Marker Buoys
  - STANAG 1301 on Minimum Conditions for Survival in a Distressed Submarine prior to Escape or Rescue
  - STANAG 1320 on Minimum Requirements for Atmospheric Monitoring Equipment located in Submarines with Escape Capability
  - STANAG 1321 on Minimum Requirements for Submarine Escape and Surface Survival Personnel Equipment (SESSPE)
  - STANAG 1382 on Emergency Sonar Beacons to aid the Detection and Localization of Distressed Submarines and the Homing onto them of Submerged Rescue Craft
  - STANAG 1390 on Submarine Rescue Manual - ATP-57
  - STANAG 1391 on Requirements of a Distressed Submarine for the receipt of Emergency Life Support Stores (ELSS) by Pod Casting
  - STANAG 1450 RD 1 on Common Connections for Ventilation/Decompression of Submarines
  - STANAG 3552 on Search and Rescue, chapter 6 – ATP-3.3.9.2 See Notes 2 and 3 at the bottom of this table.

BACKUP

Sub Group 61 on 'Virtual Ships'

Terms of Reference

- The overall aim of the SG/61 is to provide standardisation and exploitation of Virtual Ships modelling and simulation technology and processes. SG/61 will provide the framework for development and execution of Virtual Ships M&S.
- Identify, adopt, and adapt as required, approaches, processes and methods for VS M&S, to include but not be limited to:
  - Synthesis models; Simulation re-use and interoperability; Ship product data modelling, management and exchange; Integrated modelling architectures, development processes and standards; Integrated simulation architectures, development processes and standards; Modelling and simulation information repositories; Product model data repositories; Concepts and systems performance assessment, design of experiments and trade space analysis; and Human factors modelling.

SG/61 Organization

- Fully open to NATO and Partner Nations, Chairman (GBR), Secretary, (USA)
- Group activities such as studies, NIREUS concept demonstrators and small-scale developments will be subject to participation on a voluntary basis. Each nation will fund its own participation in the selected activities.
- The documentation of the Group should normally be Unclassified and no higher than NATO Restricted..

Program of Work

- Implement technology demonstrators for concepts, feasibility studies and systems performance assessment in support of MCG/6 mission.
- Support the MCG/6 STs and SGs where application of M&S is necessary.
- Review and update STANAG 4684 – Standards for Virtual Ships.
- Review and update ANEP 61 – Guidance for Virtual Ships Distributed Simulation.
- Draft a Working Paper - Guidance for Virtual Ships Data Modelling.
- Implement and maintain a repository for Virtual Ships Sub Group information.

US Agenda

- Allied Naval Engineering Publication 61
- Draft STANAG 4684 – Standards for Virtual Ships
  - Annex on Distributed Simulation
  - Annex on Virtual Ships Repository
  - Annex on Data Modelling
- Working Paper – Guidance for Virtual Ships Data Modelling
- Virtual Ships MOU for Simulation Project Arrangements

Sub Group 4 on 'Electric Warships'

Terms of Reference

- Creates, maintains and updates concepts, doctrines, requirements, developments and policies in the field of Electrical Power Generation, Control, Distribution and Utilization.
- Provide requirements for standardization and interoperability the domain of electrical power generation, control, distribution and utilization.
- Promote co-operation in developing and producing equipment and systems by identifying equipment requirements and initiating co-operative programs.

SG/4 Organization

- Interested Nations, Chairman (USA), Secretary (USA)
- Co-opt additional NATO entities as required.
- SG/4 is to be comprised of NATO and Partner government representatives. Participation in any national delegation from Research Institutes, Maritime consultant firms or industry is encouraged.

Program of Work

- Update existing STANAGs and prepare new NATO publications
- Produce design guidance, education and training documentation on safety, installation, testing, operation, utilisation and maintenance of electrical systems.
- Develop design guidance or standards that incorporate sustainable technologies with the aim of reducing fuel consumption and emissions.
- Exchange information on present and future concepts and doctrines for Naval Ships in the areas of electrical power generation, control, distribution, utilisation and power quality and service.
- Maintain close liaison with other NATO Groups or Agencies and national institutions.

US Agenda

- STANAG 1008 Ed 9 on Characteristics of Shipboard Low Voltage Electrical Power Systems in Warships of the NATO Navies
- ANEP 44 on Compendium of Information on Electrical Power Generation and Distribution Practices of NATO Navies
- STANAG 4390 Ed 1 on Tests and Requirements For Submarine Main Lead Acid Batteries
- STANAG 4143 Ed 1 on Ship/Shore Connection Terminals for 3-Phase AC Power
- STANAG 4287 Ed1 on Electrolyte for Main Lead Acid Batteries of Submarines
- Support ANEP 77 on NATO Naval Ship Code where is necessary for the electrical systems.

Sub Group 7 on Vulnerability

Terms of Reference

- **Aim -** The aim of Sub-Group 7 (SG/7) is to develop & promote design measures that enable survivability of NATO naval vessels in a cost-effective manner.
- **Scope -** Survivability is achieved through reduced susceptibility, reduced vulnerability and improved recoverability, thus increasing the ability to successfully execute their mission.
- SG7's activities covers the vulnerability and recoverability elements of survivability, including the effects of weapons against ships and submarines, equipments and personnel, the protection against and recovery from such effects.

SG/7 Organization

- Chairman (GBR), Secretary (GBR), Interested Nations.
- The following Nations typically attend: AUS, BEL, CAN, DEU, ESP, FRA, GBR, ITA, NLD, NOR, PRT, and USA. SG/7 has agreed that the seven special status nations (Australia, Austria, Finland, Ireland, New Zealand, Sweden, and Switzerland) may participate as full members of SG/7.
- Partner Nations have not been invited to participate due to security concerns.
- The level of classification at which SG/7 operates is at the discretion of SG/7, up to and including NATO SECRET.

Program of Work

- 1-DC Equipment Inventory and Website – 2-Survivability conference
- 3-Equipment and Personnel Kill Criteria work item
- 4-Life Effects on Shock Mounts work item
- 5-Use of modelling and simulation as an alternative to FSST
- 6-Survivability Guide Book – 7-Weapon effects on commercial structures
- 8-Acceptance of Warship Vulnerability and Recoverability Requirements
- 9-CBRN - Pre Wetting – 10-CBRN - Cleansing Station Design
- 11-Watermist – 12-Smoke management
- 13-Recoverability Methodology – 14-NOVEC 1230
- 15-Halon alternatives (non-water based)
- 16-Firefighting in extensively damaged compartments
- 17-Development of new methods and systems for flooding control
- 18-Vulnerability Features of New Technology

US Agenda

- Establishing and maintaining the STANAGS and ANEPS
- Establishment of common standards, interfaces, procedures and practices for Damage Control, Firefighting, and CBR Defense.
- Improved understanding of the vulnerability of commercial structures.
- Improved modeling and simulation for vulnerability and recoverability assessments.
- The ToR has recently changed to add submarines to this SG. Previously it had been limited to surface ships. US involvement in discussions concerning submarine survivability will be extremely limited.

Sub Group 7 on Vulnerability

Terms of Reference

- Ship combat survivability
- Custodianship of ANEPs and STANAGs

SG/7 Organization

- Chairman (GBR), Secretary (TBD), Interested Nations.
- The level of classification at which SG/7 operates is at the discretion of SG/7, up to and including NATO SECRET.

Program of Work

- 1-DC Equipment Inventory and Website – 2-Survivability conference
- 3-Equipment and Personnel Kill Criteria work item
- 4-Life Effects on Shock Mounts work item
- 5-Use of modelling and simulation as an alternative to FSST
- 6-Survivability Guide Book – 7-Weapon effects on commercial structures
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- 18-Vulnerability Features of New Technology

US Agenda

- STANAG 4137
- STANAG 4549
- STANAG 4142
- STANAG 1169
- ANEP 43
- ANEP 76

Specialist Team on Total Ship Systems Engineering

Terms of Reference

- Use a capabilities based approach to establish a framework to orchestrate, integrate and evaluate complex systems comprised of many elements (concepts of operations, operational planning, natural environment, warfare environment, allied and adversarial naval assets, etc.).
- Evaluate the aggregation of systems in operational scenarios at the tactical and strategic level.
- Provide the framework for execution of MCG/6 focus studies.

ST TSSE Organization

- Interested Nations, Chairman (NLD), Secretary (USA), IMS, ACT, SHAPE and MCG/6 SGs and STs.
- Co-opt additional NATO entities as required.
- ST TSSE is to be comprised of NATO and Partner government representatives. Participation in any national delegation from Research Institutes, Maritime consultant firms or industry is encouraged.
- Based on the Programme of Work items, the level of classification may drive separate Partner and/or industry sessions.

Program of Work

- To establish interfaces with the operational community (ACT/ACO, NATO MAROPS Working Group).
- Adopt the NATO operational community standards to include, but not limited to scenarios; exercises; and operations, missions and tasks.
- Adopt, adapt as required and to identify where common, approaches, processes and methods for systems engineering to TSSE, to include but not be limited to: Requirements process; Functional breakdown; Architecture and design; System integration and optimization; Capabilities assessment (MOE/MOP); and Verification, validation and accreditation.
- Take action upon CNAD priorities as directed by MCG/6.

US Agenda

- Execution of TSSE Programme of Work items to be executed via:
  - NATO Member/PfP Unclassified unfunded efforts;
  - Existing multi-lateral agreements;
  - NIAG funded study.
- Execute the ST TSSE Focus Study in a Deployable Littoral Warfare Capability scenario.

Specialist Team on Ship Costing

Terms of Reference

- Collect and analyze recent information available (in the nations) on current best practices for predicting and analyzing costs of naval ship programs.
- Consider primary elements of life cycle costs (design and engineering, construction, in-service and inactivation) and investigate opportunities for sharing current practices and tools for ship costing including cost risk analysis.
- Establish links with other NATO groups within MCG/6, such as total ship system engineering (TSSE), to promote harmony across related functions or costing issues.

ST SC Organization

- Participation is open to all NATO members and partners, Chairman (USA), Secretary (XXX)
- Nations willing to participate on current best practices for estimating the costs of naval ship programmes will provide:
  - One costing expert, as a minimum, to participate in the analysis activities and attend meetings as they are identified to take place by the Chairman of the Group,
  - One focal point of contact in the respective Ministry of Defense (MoD),
  - Pertinent information to reflect the nation's experience, terms and definitions, and current ship cost analysis tools and methods, and
  - The expertise to help ensure that the product be useful to future work in NATO.

Program of Work

- Released ANEP-41 Edition 4 in Feb 2006.
- Explore methodologies, models and analytical tools to determine best practices for predicting and analyzing costs of naval programs and for quantifying risk.
  - Examples are tools and methodologies for estimating: lead-ship engineering and design effort, software, in-service cost impacts (including crew training, end of life dismantling, etc.).
- Investigate opportunities for sharing current practices and tools for ship costing. Produce a written report and/or formal presentation (to MCG/6) with findings and recommendations for possible further updating of ANEP-41 and ANEP-49.

US Agenda

- ANEP-41 Ed. 4 on Ship Costing
- ANEP-49 Ed. 2 on Ways to Reduce Cost of Ships

Specialist Team on Seaway Mobility

Terms of Reference

- Develop and maintain a Program of Work and Schedule to achieve the aims within the time constrains.
- Produce a Seaway Mobility STANAG based on previous work and results from MCG/6 manoeuvrability group (ST-NSM, ST-SM, ANEP 70, 78 and 79). The STANAG shall be a concise document with a main focus to support the naval ship design process and with the purpose of providing assessable criteria for manoeuvring and control in calm water and where applicable in a seaway. Manoeuvring criteria shall be organised into safety as well as mission effectiveness.
- Report progress to MCG/6

ST SM Organization

- Chairman (SWE), Secretary (TBD)
- ST SM will be comprised of ship design experts from the NATO and Partner governmental (ie, civil servant or navy) naval architecture communities. Participation in any national delegation from Maritime Research Institutes, Maritime consultant firms or industry is encouraged.
- ST SM shall liaise directly at the equivalent working level with any other body or staff considered necessary to the achievement of the aim including the IMO and national classification societies.
- The ST-SM shall in particular liaise with MCG/6 ST Naval Ship Safety and Classification on safety issues.

Program of Work

- Report on national manoeuvrability and Seaway Mobility activities; Encourage liaison with other related groups; Encourage national consultant firms, industry, model basins, maritime research institutes etc. to provide input at team meetings; Establish an initial STANAG document structure taking into account ST-NSSC goal based structure/format of STANAG 4154; Review and update Naval Mission list in ANEP70 considering interoperability; Review and re-use nationally used manoeuvrability criteria and standards and established manoeuvrability criteria and standards such as IMO/DNV; Agree framework for setting criterion, Sort requirement and criterion in Mission Effectiveness and Safety respectively; Identify missions, criteria, target & safety requirements; Review and update ST-NSM manoeuvrability data base based on national ship data; Take into account existing ship data for criteria development; Identify information/criteria required from existing and planned ships; Develop values for criteria based on all available information; Produce Initial draft of STANAG (layout & contents); Produce Draft STANAG; Produce Final Draft STANAG

US Agenda

- ANEP-46 Ed. 1 on List of References on Seakeeping Performance Assessment
- ANEP-70 Ed. 1 on Guidance for Naval Surface Ships Mission Oriented Manoeuvring Requirements
- ANEP-79 on Controllability and related Safety Issues for Naval Surface Ships
- ANEP-78 on Naval Surface Ships Mission Oriented Manoeuvring Requirements Specification and Verification Templates
- STANAG 4154 Ed. 3 on Common Procedures for Seakeeping in the Ship Design Process

Naval Ship Safety Code

Terms of Reference

- The ST would cover surface ship safety and on the Annex to IMO SOLAS, that is: I General provisions; II-1 Construction - Structure, subdivision, stability, machinery, electrical systems; II-2 Construction - Fire protection, fire detection and fire extinction; III Life-saving appliances and arrangements; IV Radiocommunications; V Safety of navigation; VI Carriage of cargoes; VII Carriage of dangerous goods; VIII (not used (nuclear ships)); IX Management for the safe operation of ships; X Safety measures for high-speed craft; XI Special measures to enhance maritime safety; XII (not used (bulk carriers)); Appendix – Certificates.

NSSC Organization

- NATO/PFP Unclassified, Releasable to Australia.
- Specialist Team activities will be subject to participation on a voluntary basis. Each nation will fund its own participation in the selected activities.
- The working documentation of the Specialist Team shall normally be no higher than NATO Restricted or equivalent.
- The organisation including the initial Study Groups: General Provisions Editorial consistency between SG, Lifesaving (including Escape & Evacuation and Safety of Navigation.

Program of Work

- Requirements Harmonisation. To identify common areas of requirement within the scope of the work of the Specialist Team.
- "Naval Ship Code" Development. To prioritise the work of the Study Groups and identify Lead Nations and secretariat.
- Information Exchange. To provide a unique forum for sharing knowledge and experience on safety-related matters (including casualties) within the scope of the Terms of Reference.
- Leverage Commercial Resources. To keep merchant shipping safety-related developments in standards and procedures under review, and consider their application to naval ships.
- Milestones: Phase 1 - Establishment, Phase 2 - Enlargement and Phase 3 - Consolidation.

US Agenda

- ANEP 77

Submarine Rescue

Terms of Reference

- Initiate, develop & process standardization proposals to establish common guidance, doctrine & standard procedures for the conduct of submarine search, escape and rescue, to include, but not be limited to, the subject areas listed below, while taking into account existing national and allied publications, recent technical developments and new operational requirements:
  - Techniques and training methods.
  - Current and new equipment for use, and areas for development, in submarine escape and rescue techniques.
  - Communications related to submarine emergency situations.
  - Survivability.

Sub-Rescue Organization

- Chairman: FRA; Membership: All NATO, PfP, other submarine operating nations sponsored by NATO members. 4 Panels.
- SMERWG Medical (MED) Panel
- SMERWG Submarine Escape Equipment (SEE) Panel.
  - (Panel Chair - US, NAVSEA Rep)
- SMERWG Operational Doctrine (OPD) Panel. (Panel Chair - US)
- SMERWG Rescue Element (REL) Panel
  - The purpose of the Rescue Elements (REL) Panel is to provide submarine rescue assets operators, users and potential users input to the SMERWG regarding all aspects of submarine rescue assets ownership, capability management, and operation.

Program of Work

- Provide the task list to the International Submarine Escape and Rescue Liaison Office (ISMERLO), for continuity of annual work effort.
- Monitor development of the ISMERLO Knowledge Management System.
- Review & update the ISMERLO CONOPS.
- Review, on a two years cycle, the promulgated STANAGs and Publications
- Evaluate lessons identified & learned from recent operations and exercises with a view to producing new or amended standardization proposals.
- Carry out, or co-ordinate, such tasks as may be directed by the MCMSB.
- Foster joint and multinational research and test programmes in order to achieve economies through the best use of resources.
- Consider proposals for greater operational co-operation and the potential/future involvement of other submarine operating Nations.
- Encourage SMERWG member Nations conducting Nat'l SMER exercises to circulate advance notice to promote further exchange of information.

US Agenda-Consistent w/SMERWG

- Increase the presence of non-NATO Countries.
- List all rescue elements in the ISMERLO Web-site(rescue elements page)
- Develop of new Edition of STANAG 1297.
- Development & issue RD of STANAG 1469-Escape Training Health Criteria
- Review ISMERLO T.O.R.; recommend its formal issue care of the ASC
- Issue the RD of ATP-57(B); begin declass process of ATP-57 (B)
- Develop an Educ/Train doc to either be an add. to ATP-57 or a sep. doc
- Review ATP-57(B) future change proposals
- Monitor PR07 & BMH08 planning to ensure incorp of ATP-57(B)
- Carry on first review of MINI-POD STANAG Study Draft.
- Develop new editions of STANAG 1301 and STANAG 1321
- Development of pressurized

rescue decompression tables