Navantia

Combined Naval Event 2023

Combat Cloud in Amphibious Operations, use case

25th May 2023 – Jose Espinal

Main Topics

1. Naval Combat Cloud (NCC) principles
2. Amphibious Operations overview
3. Use case, how was done
4. Naval Combat Cloud as Force multiplier in AO phases
5. Naval Combat Cloud as Force multiplier in AO support areas
6. Combat Cloud in the future Amphibious Operations scenario

Naval Combat Cloud Principles

Significant improvement of the operational capabilities of the Naval Force at Strategic, Operational and Tactical level, through the smart processing and distribution of information in an agile, decentralized and secure manner, achieving complete and unique situational awareness, and allowing collaborative planning, direction and execution of naval operations, including those with contribution of the Naval Force to multi-domain operations, both national and in coalition

Realistic approach
Naval Cloud Will Not replace on board CMS

Excomms challenge. Resilience
Living in DDIL. Transparent connectivity vs ExComms

Agile SOA oriented
Services reconfiguration: mission, damages…

Naval Units hosting MDO Cloud infrastructure
Space, weight, power, sensors, protection

Achieve the maximum effectiveness of UxVs
Organic and No-Organic concepts could become obsolete

Use of COTS techs, HCI, AI, LEO, BD, 5G, VR,...
But Cyber, EM and data sovereingty secured

Solutions for existing vessels and HQ
NCC Not only for future vessels but also for legacy ones

NAVAL FORCE MULTIPLIER

Interoperability, Multi-Domain, Multi-Country
From design. Avoiding complex planning and procedures

Coexistence with current Tact. Data Links
LINK-16 will not be switched-off "tomorrow…"

New Dev & Test methodological approaches
MBSE, DEVSECOPS, Naval Cloud Services factory…

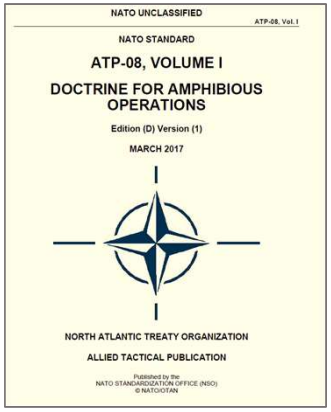
Multiple axis Data "explosion"
Dual use military-industry. Classification. Sovereignty

Export opportunity
Challenging. Imaginative schemes. Supported by politics

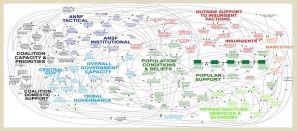
Teaming efforts between Industry and Navies
Mgmt., Operational, Technical and Funding challenges

Synergies with EU and NATO Cloud initiatives
EDINAF, MDOCC, FCAS …

AMPHIBIOUS OPERATIONS OVERVIEW



CHARACTERIZATION
From ATP-8 (D)



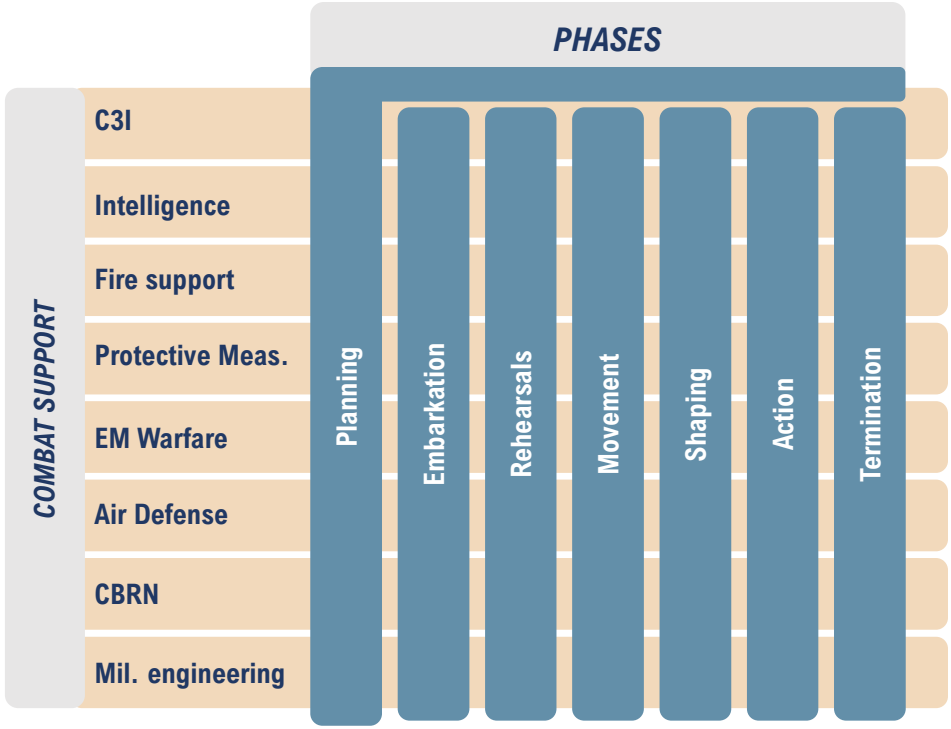
"Complexity and vulnerability of forces …unity of effort and operational coherence.

Shared intelligence, … shared understanding, a COP, … open communications between the staffs.

Closely integrated application of capabilities

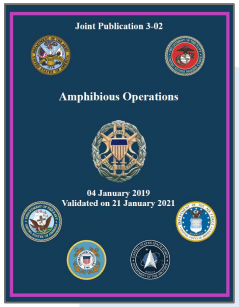
Should integrate all the naval assets … coordinating the joint capabilities

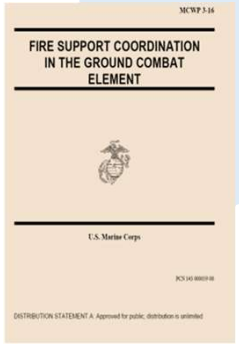
Integration of Naval, air, space, SOF and landing Forces.

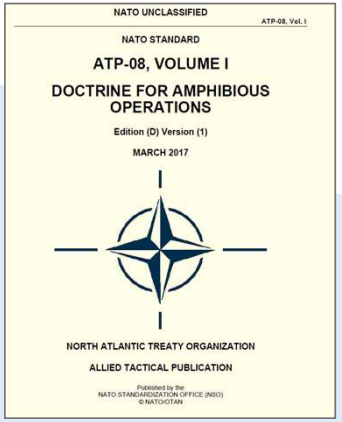


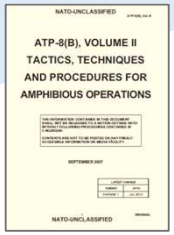
Use Case, how was done

How can the Combat Cloud be used as a Force Multiplier in Amphibious Operations









ATP-8 (D) Vol II has been used to a lesser extent

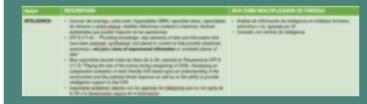
CURRENT DOCTRINE FOR AMPHIBIOUS OPERATIONS

Σ

Enabling Technologies

- Big Data, data analytics
- Artificial Intelligence, ML, DL
- Cybersecurity
- Military 5G
- Image analisys
- Cloud deployment
- Communications

USE CASE DETAILED OUTPUT TABLES



CLOUD AS MULTIPLIER IN EACH PHASE

CLOUD AS MULTIPLIER IN EACH COMBAT SUPPORT AREA

NCC as a Force multiplier in the Planning Phase

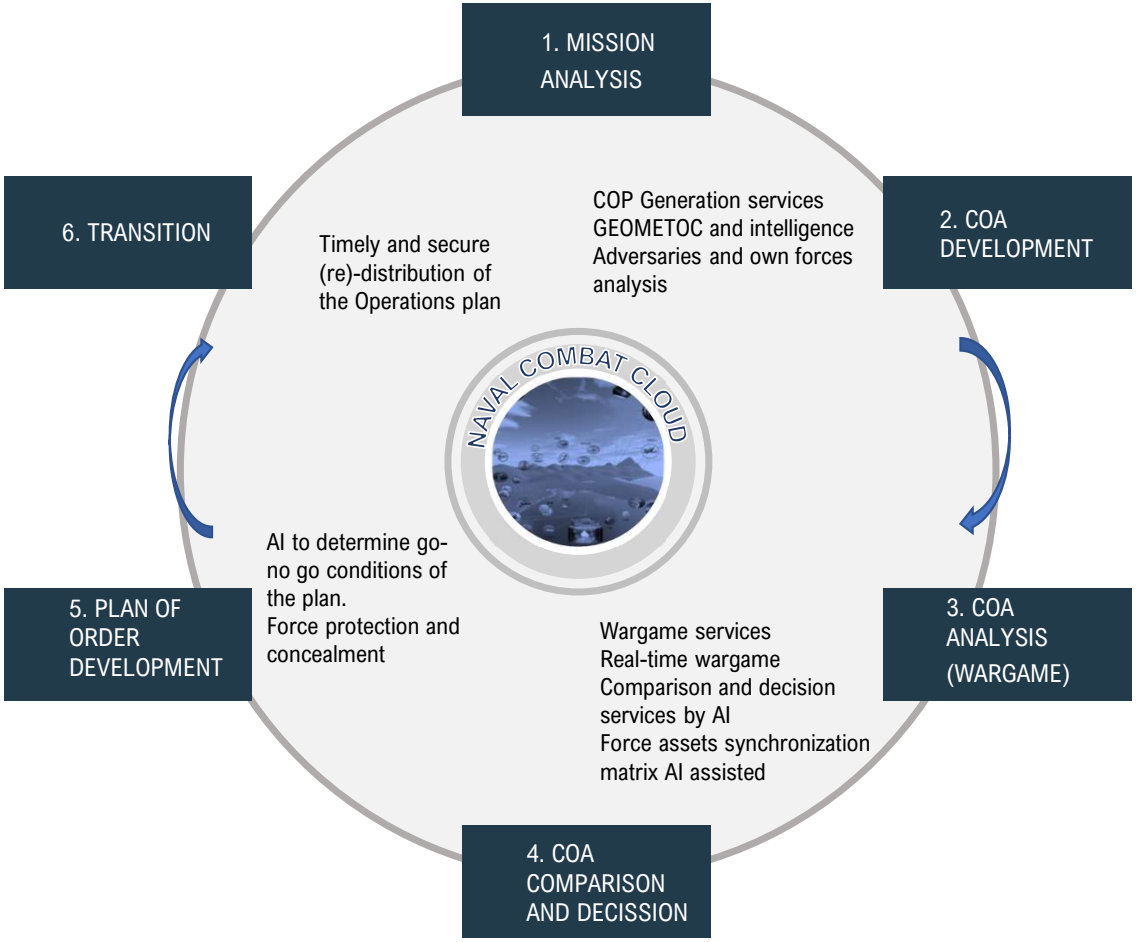
Table 3. SHAEF 5-Day Wave Forecast for 5/9 June 1944*

Swell: In western approaches to English Channel, and south of 50 degrees N up Channel as far as the Cherbourg Peninsula: 6 to 7 feet Monday, decreasing to 4 to 5 feet Tuesday, 3 to 4 feet remainder of period, westerly direction throughout.	
Sea:	**Monday, 5 June:** (a) Western approaches to English Channel: 8-10 feet mixed sea and swell. (b) Near the English Coast, in the Channel: 3-4 feet west of Portland Bill, 2-3 feet in the east. (c) French Coast (except western Cherbourg Peninsula): 5-6 feet decreasing to 3-4 feet. (d) Southernmost North Sea: 5-7 feet.
	Tuesday, 6 June, D-Day. Areas as above. (a) 3-4 feet wind waves. (b) 2-3 feet becoming 3-4 feet in the west. (c) and (d) 3-4 feet except for 2-3 feet in southwestern Bay of Seine.
	Wednesday to Friday, 7, 8, and 9 June. (a) 5-7 feet mixed sea and swell. (b) 2-3 feet, risk of 4 feet. (c) 3-5 feet, but 2-4 feet in Bay of Seine.

* Prepared at 2200 DBST, Sunday, 4 June 1944, by 1st Lt. John Crowell, AC.

Weather forecast map, 5 – 9 June 1944

- Includes from the receipt of the Initial Directive to Force boarding
- AO are one of the most complex military operations to plan
- Includes re-planning throughout the operation, continuous evaluation (circularity)
- Planning "pre-programmed" or not
- Integrated planning: C2, intelligence, fire support, movement and maneuver, protection and sustainment



The Navy planning process – NWP 5-01

NCC as a Force multiplier in the Embarkation Phase

- Must support the Plan. Enabling rapid achievement of the expected combat capability of the LF from cero
- Self-sufficiency of units. Achieve combat capability
- Dispersion. Avoid the multiplier effect of equipment losses
- Types of cargo: Combat load (highest priority, strict order), administrative burden
- We must take into account the possibility of change on the original plan

COMBAT CLOUD AS MULTIPLIER

- Artificial Intelligence services for onboard cargo optimization
- AI simulation services of effect on combat capacity and support of material loss according to its distribution (in LCM, Helos...), among the different assets of the Force
- Integration services with the Cargo management systems on board and landing fleet
- Access/Integration of Command Centers to the NCC to monitor the progress of the boarding phase
- Integration with logistics centers, for cargo optimization, incident reporting, report of changes to the plan, coordination of needs and shipments...

NCC as a Force multiplier in the Rehearsals Phase

- Check the adequacy of plans, the sequence and timing of operations and the readiness of participating forces,
- Ensure all organization levels are familiar with the plans, Check communication and information systems and Provide the opportunity to reconfigure on-board forces and equipment.
- “In order to avoid enemy detection of rehearsals, and thus amphibious force intentions, maximum use of war-gaming and simulation must be considered”

COMBAT CLOUD AS MULTIPLIER

- Virtual rehearsal scenarios, including mixed virtual/physical. The Cloud would provide the simulation services
- Discretion, resources economy, participation of forces allocated in remote places, adversary simulation automatic (moved by AI) or human “red teams”.
- Record of the operations carried out in the test and comparison with the established Plans. Generating plan change suggestions using AI
  - NCN participation in the different types of virtual trial (Staff, integrated, separate)
  - Possible common services with those used in Planning (war game) and previous AO forces training

NCC as a Force multiplier in the Movement Phase

- From embarkation of the Force to arrival to the area of operations
- It is vital to know (situation, type, scope, readiness ...) the means of surveillance and weapons of the adversary
- Opportunity to exploit the sea as a maneuvering area
- Challenge to keep the discretion of the Force moving. Special attention to deception and OPSEC plans
- Establishment of a complex system of routes and areas

- ATP-8 (6-9) – "Individual movement group commanders must remain aware of the need for maintaining the schedule and proceeding along prescribed routes. "

COMBAT CLOUD AS MULTIPLIER

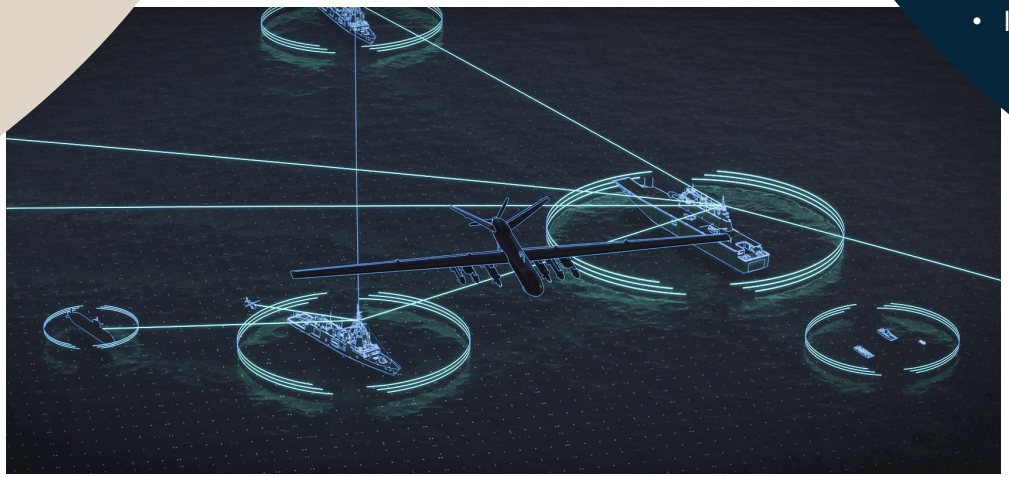
- Support to dynamic re-planning en route due to change of the scenario etc.
- Determination and dissemination in real time of the COP to the participating assets, including remote ground command centers, based on the information provided by all the assets of the Force
- Continuous and automatic comparison of the progress of the phase with respect to what was planned, alerts and suggestion of alternative plans, self-assessment of possible need for postponement in the landing operation: weather conditions, detection of unexpected adversary forces, others

NCC as a Force multiplier in the Shaping Phase

- Can be develop almost before each of the other phases, but especially during the movement phase and at the beginning of the Action phase.
- The ultimate objective is to reduce the risk of the main landing by: (1) isolating the Target Area (2) obtaining information about the adversary (3) Preparing the amphibious target area.
- They are a compromise between the need for their development and the discretion of the amphibious operation itself.
- Examples: demining and obstacle clearance operations, reconnaissance (SOF, submarines, USV, UAV, USUV...), capture of positions (missile launchers, radars...), denial of areas of strategic interest

COMBAT CLOUD AS MULTIPLIER

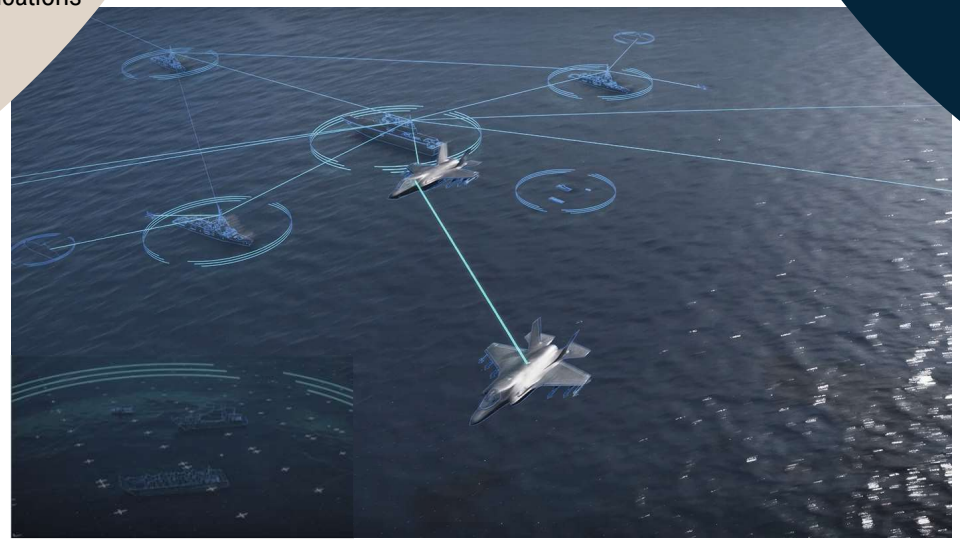
- AI-supported mine localization services. Real-time monitoring of operations (area covered, detections, status...)
- Real-time integration of information obtained into the COP
- Real-time update of GEOMETOC conditions, analysis of its impact on planning
- Modification to the initial Planning, for example in the Fire Support Plan when modification is detected in the adversary positions
- ...
- Intelligent control of participating UxV



NCC as a Force multiplier in the Action Phase

- From the arrival of the AF to the Operations Area to the termination phase
- Critical phase due to the vulnerability of the own forces and the need to achieve combat power inland from zero.
- Includes entities such as: Units provided by each of the ships, Beaches (or others in case of airborne disembarkation) object of disembarkation, Channels / access routes to the beaches, group of units (wave) that disembarks on each beach and its schedule, Areas of interest.
- Requires control of assets participating in the vessel to land movement, in that landing plan only minor modifications may be made.

COMBAT CLOUD AS MULTIPLIER



- Integration of ship to shore assets monitoring and control services
- Integration of LCM, AAV and Helos in the COP
- Real-time update of available assets in the OA, replanning and command support
- Integration of land forces assets down to platoon level into NCC using rugged Tablet Notebook Computers. 5G connectivity bubbles.
- Increased efficacy, minimize fratricide
- Real-time integration for targeting in Naval Gunfire Support (NGS) and Close Air Support (CAS) (real-time integration of targets location and relevant data (images, other…)

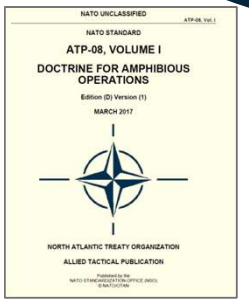
NCC as a Force multiplier in the Termination Phase

- Starts when the objectives set for the Amphibious Operation have been met
- Amphibious forces on land re-embark, stay ashore or other options.
- The last task is to analyze massive amount of data captured during the operation

COMBAT CLOUD AS MULTIPLIER

- Recorded data is dumped to the corresponding shore analysis center for PMA (Post Mission Analysis). Processing and analysis of the recorded information of the real operation takes place, assisted by AI and Dig Data, the output of that analysis are multiple:
- Generation of structured knowledge base (Lessons Learned >>> **modification of doctrine, tactics, techniques and procedures**)
- Operations research
  - Generation of information packages to feed AI engines (for Planning, Testing, Training ...)
  - Evaluation of intelligence data obtained and
  - Updating Intelligence Databases
  - Investigation of special legal cases such as fratricide
  - Human training data packages generation

DATA. "food" FOR AI ENGINES

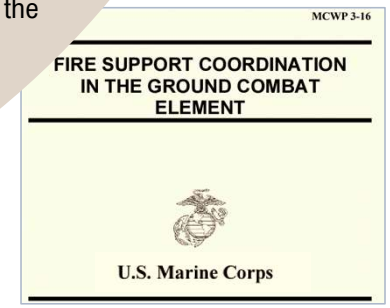


NCC as a Force multiplier in the Fire Support area

- Use of weapons or other actions with lethal effects (or not) on the enemy in a **synchronized and integral way.**
- From assets on land (Field Artillery, Landing Artillery Group), air (Air Support – CAS), sea (Naval Fire) or actions of special forces.
- It is a synergy between ISR/ISTAR media (detect, locate, identify, classify), C2 (information fusion and decision making) and weapons (of all types including EW and from all types of platforms
- Plan early and continuously. Continuous flow of target information. Consider using all available means. Use the lowest level/step capable of achieving the desired effects
- Avoid duplication and fratricide

COMBAT CLOUD AS MULTIPLIER

- Direct Ground Force – Aircraft Integration in CAS Operations
- Automatic checking of Fire actions to avoid duplication
- Automatic force disposition check to avoid fratricide
- AI support to suggest the best action to achieve desired effects
- Coordination of fire Naval - air operations (ACA – Airspace Coordination Area) considering the **battlespace geometry** (volumes, areas and lines). Implementation of intelligent FSCM (Fire Support Coordination Measures).
  - Coordination of actions with electromagnetic warfare attacks.



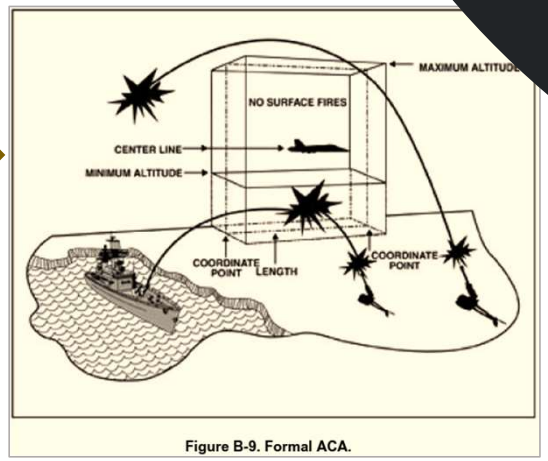


Figure B-9. Formal ACA.

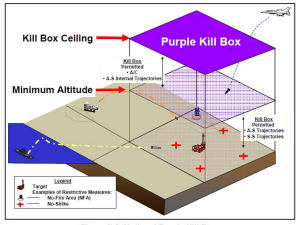


Figure II-2. Notional Purple Kill Box

NCC as a Force multiplier in the C3I area

- **"AO require a reliable, secure, and flexible system of command and control and communications capable of supporting rapid decision-making and execution to maintain a high tempo of operations"**
- C3I Systems Support Plan must:
- Provide emission control plan and information security posture that balances OPSEC with operational requirements.
- Provide transmission and cryptographic security.
- Provide safe C2 means.
- Provide friendly forces' position reporting to a common operational picture.
- Provide access to meteorological and oceanographic forecasts and information impacting amphibious operations planning and execution

COMBAT CLOUD AS MULTIPLIER

- Analysis (AI, BD…) of massive C2 non structure or multiformat data to create real time useful information to the AO Command, including adversaries and Multidomain battlefield picture predictions
- The Cloud will facilitate the rapid transition of forces and command without disruption from ship to shore avoiding the "data gap". The COP will be maintained, and land forces will be provided with all the needed information
  - Rapid ground deployment of secure 5/6G smart connectivity Bubbles
  - New generation smart connectivity services: Allowing intelligent routing, prioritization, real-time adaptation to availability. Transparently to customer services. Efficient use of communications, and mechanisms to avoid competing for bandwidth.

COMBAT CLOUD IN THE FUTURE AMPHIBIOUS OPERATIONS

CURRENT/FUTURE AO CHALLENGES	NAVAL COMBAT CLOUD RESPONSE
 **A2/AD and LOCE scenarios**	➢ Cloud Will permit accurate planning and replanning, multiplier in the pace of the land deployment, precise fire Support while maintaining low level of fratricide
 **Need for DMO and OTH**	➢ Combat Cloud is distributed by design, providing the best tolos of collaboration in DMO ➢ Portable cloud nodes ready to be deployed in any type of ship
 **Simultaneous amphibious assaults in different places**	➢ Wargames cloud services. Collaboration based in the information sharing and unique, complete and real time distributed COP. Sincronization of combat action including hard and softkill
 Sea as a maneuvering area	➢ Maximize the commonatity among Planning, rehearsal and training cloud services, including AI generated multidomain scenarios based in post mission análisis, other relevant data and random scenarios ➢ Delocalized training of the amphibious force through the participation of real assets, real assets in training centers and simulated
 **Training, readiness and leadership**	

Summary

1	Naval Combat Cloud (NCC) principles	Based on distributed services, Disruptive technologies, applicable to all military levels, connectivity challenge
2	Amphibious Operations overview	Complex, Multidomain, rapid deployment of forces inland from cero, vulnerability
3	Cloud in AO use case, how was done	Analysis of the current AO doctrine from the cloud technologies perspective
4	Cloud as Force multiplier in AO phases	Applicability of the Cloud principles from Planning to Termination
5	Cloud as Force multiplier in AO support areas	Cloud in the C3I and Fire Support combat support areas
6	Combat Cloud in the future Amphibious Operations scenario	Cloud giving response to current/future AO challenges: A2/AD, LOCE, MDO …

THANKS FOR YOUR ATTENTION!

ANY QUESTION ?

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