Summary

- Last 4 months of 1943: 9 ships vs. 62 u-boats
- The **Campaign Failed** (never even close)
  - 500 Kton/month goal did not adequately consider shipbuilding or cargos versus hulls.
  - Shipbuilding (5800 built vs. 3500 lost)
- Technology
- Tactics & Training
- However 80000 US/British seaman killed (23/ship)
- Germans lost 700 boats and 30000 sailors (43/boat)
- Highest loss rate of any service in the war (75%)
US WWII Campaign

“Conduct unrestricted submarine warfare against the Japanese Empire”

Adm Harold Stark
OPNAV Directive; Dec 7, 1941
US Advantages

• Very good boats
• Well trained crews
• A deep-seated belief in technology
US Fleet Boat
US Fleet Boat
US Disadvantages

- Terrible torpedoes (and a bureaucracy in complete denial)

- A complete doctrine to strategy mismatch and therefore
  - CO’s that could not carry out the mission
  - Staffs that could not support the mission or fix the problems.
Art. 22 London Naval Conf:
“...a submarine may not sink or render incapable of navigation a merchant vessel without first having placed passengers, crew, and ships papers in a place of safety.”
1942 and 1943

- Got rid of most CO’s
- Developed complementary doctrine, strategy & tactics
- Introduced (American) wolf packs
- Fixed the torpedoes (finally)
- Slowly but steadily got better
- By late 1943, the force was ready.

(Adm Lockwood)
1944 Results

- Airtight blockade
- Japan’s merchant fleet destroyed
- Complete interruption of the Japanese ability to wage war.
Japanese Losses To Submarines
1941 - 1945

Tonage losses (Ktons)
## Japanese Economic Collapse

### IMPORTS

<table>
<thead>
<tr>
<th></th>
<th>1941</th>
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<th>1943</th>
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<td>Iron (Ktons)</td>
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Food supplies in 1945 were 32% of 1939 levels.
US Strategic Bombing Survey

“The war against shipping was perhaps the most decisive single factor in the collapse of the Japanese economy and logistic support of the Japanese military and naval power. Submarines accounted for the majority of vessel sinkings and the greater part of the reduction in tonnage.”
Why Did It Succeed?

- Japan did not see an existential threat until it was too late
  - Put essentially no resources into ASW.
  - Did not make needed changes.
  - Racism
- US flexibility and improvements in
  - Doctrine
  - Tactics
  - Technology
AND, Got the right COs
US Submarine losses

- 1941: 1
- 1942: 6
- 1943: 16
- 1944: 19
- 1945: 8

Graph shows the number of US Submarine losses from 1941 to 1945.
JANAC

- Post-War reconstruction
- Reduced Submarine “scores” from 10M tons to 5.3M tons.
- Examples:
  - O’Kane: From 31 to 24 ships
  - Flucky: From 25 to 16
  - Morton: From 17 to 19 (but halved tonnage total)
Costs

- **Japanese**
  - 1314 ships for 5.3M tons
  - 1 battleship, 8 Carriers, & 11 cruisers
  - 12% of her fleet remained but it had no fuel.
  - 116000 seamen became casualties !!

- **Americans**
  - 52 subs (out of 263 that made patrols)
  - 3500 of 16000 men killed (22%)
  - Sub force was 1.6% of the entire Navy
Japanese Economic Collapse

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Food supplies in 1945 were 32% of 1939 levels.
Questions on Anything?

The only picture of a submarine on patrol you’re ever going to see.
OUT FOR A DRIVE.
USS BOSTON (SSN 703)
1986
Fools and crazy men

A brief history of submarine warfare

(Bill Riffer)
The Cold War

“Submariners knew they were part of the only force that practiced not simply against allies in war games, but by meeting the enemy, day in and day out.”

Blind Man’s Bluff
Opening Thoughts (III)

- A reminder about classified stuff; i.e.:
  - > 25 knots
  - > 650 ft.
  - You bet!!!

- US / British cooperation
German Type XXI
After World War II

- Type XXI led to advanced diesel boats
  - Whiskey’s (231) & GUPPies (66)
- Sonar advances quickly
- Abelson proposed nuclear power
- Work starts at Oak Ridge
- Rickover takes over in 1950
Whisky Class SS

Guppy Conversion
USS Nautilus (SSN-571)

- Rickover’s Three Elements of Safety
  - Highest standards for design & quality
  - Flawless procedures
  - Continuous vigorous training

- Nautilus was
  - A spectacular success
    - Independent operations
    - Fleet operations
Cats & Dogs Leads to:

Skipjack & Tullibee
SSBN’s/SSN’s et al

• Settled on a basic design
• We made the decision to stop building conventional submarines
  – SSBN’s and forward deployments only
• First the SSBN story
SSB(N)’s

George Washington

GOLF

Hotel
SSBN Operations

• MAD
• Operational Doctrine
  – Op Tempo (70% vs 15%)
  – RFCO submarine vs
  – Blue & Gold crews

• US “Pull Back”
• Soviet “Pull Back”
  – Walker & Pelton
  – SOSUS
Soviet “Pullback”

Yankee / Delta III Areas

Delta IV / Typhoon Areas

1970’s

1980’s
Soviet SLBMs

- SS-N-4* (Golf/Hotel I&II)
- SS-N-5* (Hotel III)
- SS-N-6 (Yankee)
- SS-N-8 (Delta I&II)

- SS-N-18 (Delta III)
- SS-N-20** (Typhoon)
- SS-N-23** (Delta IV)
- SS-N-30** (Borei)

*Surface Launch Only

**Solid Fuel
SSN’s

• Best submarine killers

• Best intelligence gatherers

• Designed to do both well
  – Thresher (permit) (14)
  – then Sturgeon (39)
SpecOps (I)

- SpecOps became the attack boat bread & butter (you either trained to kill or you went on SpecOps)
- Four objectives
  - Indication & Warning (I&W)
  - “At Sea” presence
  - “Real world” training
  - Intelligence gathering
SpecOps (II)

- Priorities (In order)
  - Safety
  - Remain Undetected
  - Conduct the assigned mission

- Intelligence
  - Elint
  - Comint
  - Opint
  - Acint
  - Photoint
For Example
SpecOps (III)

• Very heavy op tempo (60 – 70%)

• Resulted in serious retention issues
  – Bonus program
  – Mandated 50% limit
Other Missions

• Carrier Direct Support becomes important
  – Los Angeles Class (Need for operational speed)

• Tomahawk
  – TLAM (N)
  – TASM
  – TLAM (C)

• Strike Warfare
  – 688 (I) w/ VLS (12 birds)
  – Ohio SSGN (154 birds)
Soviet Attack Sub Operations

• Early on they were either for
  – Anti-carrier ops or
  – Anti-convoy ops
• Heavy emphasis on cruise missile subs
• Continued mix of nuclear & diesel boats
• Many different classes (32+ vs. 4 US)
• Large force (300+ vs 100 US)
<table>
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<th>Torpedo Attack</th>
<th>Tactical Cruise Missile</th>
<th>Strategic Ballistic Missile</th>
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<td>Diesel Zulu, Whiskey, Quebec, Foxtrot Tango, <strong>Kilo</strong>, Amur, Lada?</td>
<td>Whiskey (Long Bin &amp; Twin Cylinder), Juliette I&amp;II</td>
<td>Golf I&amp;II</td>
</tr>
<tr>
<td><strong>Nuclear</strong> November Victor I,II,III Alpha, Mike, Sierra, Akula I&amp;II</td>
<td>Echo I&amp;II Charlie I&amp;II Papa Oscar I&amp;II Yasen</td>
<td>Hotel I,II,&amp; III Yankee I&amp;II Delta I,II,III,&amp;IV Typhoon Borei</td>
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Time Marches On

- Walker, Pelton, made them aware of how far behind they were
- Strategic missions took on more emphasis
- SSNs became SSBN escorts and bastion protection vessels.
- Soviet strategy became aligned with NATO strategy (War in Soviet waters)
- “Crash” program to catch up
Nw = Ls – (Le – Ndi)
Cold War Ends

- Soviets are building very good albeit very expensive subs.
- Seawolf was designed to regain lost margin; came just as the Cold War ended.
- A significant contributor to their collapse.
- We were as surprised as anyone by the speed of the collapse but not by the results.
- IT WORKED!!!!
The Sad Result
Going Forward

• 40 countries operate subs (several AIP), (6 nuclear), including:
   China – 68 (6 modern nuclear + 4 planned)
   Russia – 60 (14 modern nuclear + 6 planned)
   North Korea – 70 (inc. midgets)
   Iran – 33 (inc. midgets)
   India – 14 (with 30 planned)(1 nuke)
• Total of about 500 (not counting our 75)
• They’re not going away soon
Missions

- I&W
- Intel gathering
- Presence
- Direct Support
- Strike
- Special Operations (SOF insertion)
US Sub Force

- 52 SSN’s (18 VA’s, 3 SW’s, & 31 LA’s)
  - And is about 40% over tasked based on 50% Op Tempo

- Requirements (66 SSN’s minimum)
  - 14 forward deployed
  - 48 surge
  - 4 overhaul

- Drop < 48 in 2024 (if we can make it that far)
- Reach 48 again in 2037
- What do we need to reach 66???

Lot's of $$$
US Sub Force (2)

- 4 SSGN’s (2026; then VPM)
- 14 SSBN’s (336 tubes) (280 by 2018)
  - New START – 70% of the warheads for 20% of the $$$
  - 2027 – 2040; All Ohio’s gone
Block V: VIRGINIA Payload Module (VPM)

VIRGINIA Payload Module
- Four large tubes in a new hull section
- Uses Multiple All-up Round Canisters (MACs) already employed in SSGN & VIRGINIA Block III Payload Tubes
- Proven VIRGINIA Class construction processes
- Preserves Special Operations Force (SOF) Capacity lost with SSGN retirement
US Sub Force (3)

- The importance of deterrence
- Columbia SSBN Program
  - $96B program (≈ $5B per copy)
  - 12 units with 16 tubes each (192 tubes)
  - 20k tons, electric drive, lifetime-core
  - 1st unit to sea in 2031
  - Will have to last into the 2080’s (!)
  - Opinion! Must be a national program.
Columbia
The Rest of the World

- Russia is building a small but highly capable force
- China is committed to a modern nuclear submarine force (no one knows how big)
- Many countries buying capable subs
- AIP becoming more and more prevalent

**ANY SUBMARINE CAN BE DANGEROUS!**

- *I.e.: Cheonan*
Summary

- Many missions still exist for the force
- The future will hold both unconventional and conventional threats
- Submarine operations and construction are perishable arts
- If we lose them, recovery will be both expensive and time-consuming.
Questions on Anything?

“Happy Time”
USS BOSTON
1988