AMS CHRONICLE

IPMS DENVER ROB WOLF CHAPTER
FEBRUARY 2018

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	Treasurer	Bob Nixon	Bobnixden@comcast.net
	Newsletter Editor	Wayne Cassell	mwcassell@comcast.net
NEXT MEETING: March 07, 2018 1900	History of Buckley Air Force Base **Winter Storm Watch**		Al Gonzalez **Anything in a winter theme, any scale, any era**

EDITOR RAMBLINGS FROM THE BUNKER

Nothing new in the bunker, just the usual being sick, class prep and not finishing much. Centennial had a good meeting on 28FEB. The demo was using craft paints instead of model paints. They are much cheaper and more widely available. Paul and Bob Benko did the demo with completed models. Looks interesting as I am though the IT MUST BE THE EXACT COLOR phase. Now moving into the IF THE HATCHES ARE CLOSED WHY SPEND TIME ON THE INTERIOR? nphase. This question works better with AFVs than trucks. I finally picked up my Russian KAMAZ 6x6, Meng egg PE-2, and the Takom engineer vehicle from an earlier order. I expect to have a lot to enter for the November Better Late Than Never club contest.

Any photos of models not in the newsletter are the fault of the editor, not the photographer.

Nikto ne Zabyt
Nichto ne Zabyto

A NOTE FROM THE PRESIDENT

January Future Plans

First I want to thank Martin Sagara for part two of his January Presentation, well done.

Our March Presentation will be on the History of Buckley Air Force Base, by Club Secretary and Contest Committee Chairman Al Gonzalez.

For April and May we are scheduled to have our Kit Auction and our Annual Club Contest respectively so there is no presentation for those months.

That leads to the question as to what program will we have for June?

This past year we have been very lucky to add new members. We're just getting to know them and

they may have modeling tips and techniques that we haven't thought of.

Remember just because you have been modeling for many years doesn't mean someone else hasn't come up with an alternate way of achieving a desired effect.

Also all of us may have questions about modeling techniques or have a modeling problem we could use help with.

With this in mind the June program could be aimed at sharing tips and techniques and answering modeling questions possibly even having clinics on one to two subjects.

So the question I pose to all members is:

What modeling related subject(s) would you like to learn more about?

Do you have a technique you would like to share?

Please email me, at matt.levesque@comcast.net, with your response(s) and I will try to line up volunteers for the June meeting to address at least some of these.

If there is little interest we'll come up with another idea for June.

Thanks

Matt Levesque

MONTHLY MESSAGE FROM THE SECRETARY

1. Meeting started promptly at 7:00pm with 27 attendees.

2. Tonight's presentation was Part 2 of Martin Sagara's European museum extravaganza, this time, the French Musee de Air e Espace in Paris. Wonderful presentation!

3. Treasurer's report:

4. Tonight's contest winner of the "Enter the Dragon", Dragon/DML theme, was John Trueblood's imaginative "The Dog's Breakfast" diorama.

5. Voting:

a. The membership voted to purchase a club table for $10 for Colpar's 24 February swap meet.

b. The membership voted to support the Rocky Mountain Train Show 3-4 March with a club display table. Eight members signed up to man the tables.

c. The membership voted to purchase two awards packages for a total of $90 in support of COM-MIEfest.

6. Upcoming events:

a. Rocky Mountain Train Show, 3-4 March

b. COMMIEfest, 31 March

c. StarFest, 20-22 April

Al Gonzalez
Club Secretary

CONTEST COMMITTEE REPORT

1. Based on data from recent annual contests, the committee decided on the following:
    a. Add additional category: Armor - 1/48th scale and smaller
    b. Split dioramas into two categories: Fantasy and Historical
    Since we don't have junior modelers as club members, open the junior modeler category ONLY to non-members. This will be advertised on our club posters for the contest.
2. Action items:
    a. Make new flyers for Colpar (maybe local Hobby Lobby's and Michael's as well?), including information about junior category (Al G.)
    b. Inventory current awards, then order additional awards for this year's contest in May (Al G.)
    c. Print out registration forms (Al G.)
    d. Contact Colpar to reserve contest date. (Martin)
    e. Day of contest - man registration table (Wayne and Martin); recruit judges (Al G.)
    f. Purchase memory card for camera (Matt)
    g. Print out category table cards (Al G.)
    h. Need to find a venue and schedule October contest committee meeting (Anyone?)

Al Gonzalez
Club Secretary

IPMS/USA MEMBERSHIP FORM

IPMS No.: _____ Name: _____
If Renewing First Middle Last

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ E-mail: _____

Signature (required by P.O.) _____

Type of Membership ☐ Adult, 1 Year: $30 ☐ Adult, 2 Years: $58 ☐ Adult, 3 Years: $86

☐ Junior (Under 18 Years) $17 ☐ Family, 1 Year: $35 (Adult + $5, One Set Journals) How Many Cards? _____

☐ Canada & Mexico: $35 ☐ Other / Foreign: $38 (Surface) Checks must be drawn on a US bank or international money order

Payment Method: ☐ Check ☐ Money Order

Chapter Affiliation, (if any): _____

If Recommended by an IPMS Member, Please List His / Her Name and Member Number:

Name: _____ IPMS No.: _____

IPMS/USA
Join or Renew Online at: www.ipmsusa.org

PO Box 56023
St. Petersburg, FL 33732-6023

A NIGHT AT THE MOVIES

MODEL CONTEST

March 31, 2018

9:00 am - 7:00 pm

Registration	9:00am-12:00pm
Demos	10:00am-5:00pm
Judging	1:00-5pm
Awards Presentation	6:00pm

Models: Adults $5.00 per entry, 4 or more $20 unlimited
Juniors (17 & Under) $5.00 unlimited
IPMS Members $1.00 off discount per paid entry

Theme: If it's been in a movie or on the TV, it can be a theme entry and eligible for the Theme Award. You can also enter a "What If" such as a Ghostbuster Tank.

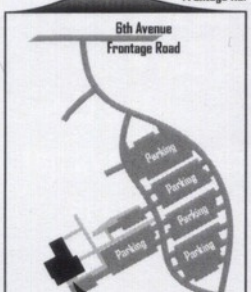
Rules: No prize-winning models from previous CoMMiESFests may be entered. Sweeps are allowed.

We'll have 36 categories, Best of Category, Best of Show, People's Choice, and other special awards.

Check our website (www.commiesfest.com) & Facebook Page (CoMMiES) for the latest info, categories list, and updates!

Vendor Tables Available!
Contact Sean at zaku2ms06@gmail.com

Contact Robb if you're interested in sponsoring an award or category
rkylwell@pclsys.net



Spectators Welcome!

Jefferson County Fairgrounds
15200 W. 6th Ave
Golden, CO 80401
303.271-6600

Mr.Badwrench64@gmail.com
commiesfest.com
info@commiesfest.com
jeffco.us/parks/fairgrounds/

CoMMiESFest 2018

THE MODEL SHOW

April 20-22 - Marriott Denver Tech Center
(I-25 and Belleview Ave, Denver CO)

Bring in all of your science fiction, science fact, fantasy, and horror models!

Celebrate the 40th Anniversary of *Battlestar Galactica*

Vipers and Cylons and Raptors! Oh, my!

"The Man" is returning again this year. Bring in any subject that would be welcome at an IPMS show -- tanks, aircraft, cars, ships, historical figures.

Make 'n' Take

Modeler's University

Door Prize Drawing

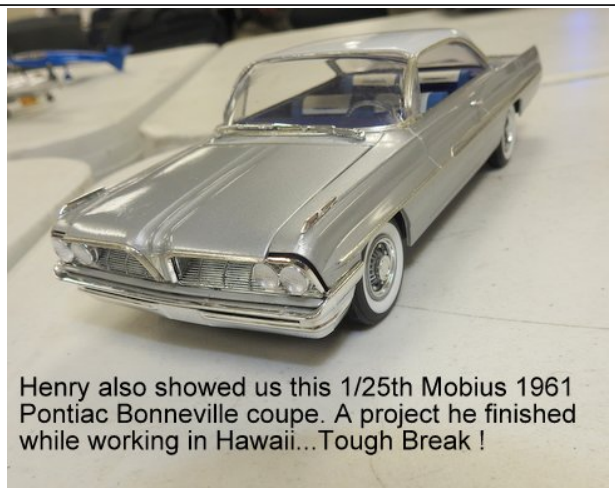
Visit us on Facebook - https://www.facebook.com/StarfestModelShow
email starfestmodelshow@gmail.com for more information

...2018 MONTHLY CONTEST THEMES		
Month	Theme	Description
January	Under the Red Star	Any subject made in Russia/Soviet Union, in Russian/Soviet markings, any scale, any era. CANNOT be Russian vehicles in another country's marking, such as North Korean MiGs
February	Enter the Dragon	Any DML/Dragon kit. Bring proof (box lid or instructions)
March	**Winter Storm Watch**	**Anything in a winter theme, any scale, any era**
April	Club Kit Auction	Get rid of your trash and buy my treasure!
May	Club contest: Crazy 8's	Any subject in any scale where “eight” is a major feature. Examples, F-8 (not F-18), V-8 engines autos, M8 Greyhound, 8th Air Force markings, hull number or race car with an 8, etc.
June	Viva la Revolucion!	Civil wars, insurrections, uprisings, revolutions...you get the idea. Any scale, any era
July	Warrior Class	Any subject named after a class of warrior: chieftain, gladiator, corsair, pirate, commando, centurion, etc. Also, named after any Indian or native tribes. CANNOT be named after a specific warrior, such as a Patton, Sherman, Lee, Montgomery, etc.
August	That's Depressing!	Any civilian subject in any scale in a version and markings appropriate to the years 1925-1945
September	Trash Haulers	Cargo and transport (aircraft, vehicles, ships), military or civilian, any scale, any era
October	SciFi and Fantasy	Any scale, any subject with a science fiction or fantasy theme
November	Better Late Than Never	Any model that would have fit any of the previous 2018 contest themes that you didn't get a chance to finish
December	Cut Throat Gift Exchange	It’s better to give than receive, but even better to steal what someone was given!

FEBRUARY CONTEST

CONTEST WINNER

Henry Jackson's '53 Studebaker Starlight coupe an AMT kit in 1/25th scale.



Henry also showed us this 1/25th Mobius 1961 Pontiac Bonneville coupe. A project he finished while working in Hawaii...Tough Break !


Eric Cain did this 48th Dragon Me-262.
V 083


John Trueblood showed his 48th Planet Bugatti Racer.


46
Su-24 MR/
Dave Bathke showed this Dragon 1/72 Su-24 "Fencer".


TERRY COOPER 'S MINICRAFT FRONTIER MD - 80 IN 1/144TH SCALE.
FRONTIER


Bob did the two "atomic bombers". This is the "Enola Gay". A 1/144th Minicraft kit.


And this is "Bock's Car". Same scale and manufacturer. along with Shapeway's "Fat Man".

Bob Nixon's 1/144th Minicraft B-36D.


Perry Olson brought his Dragon 48th Hughes MD 500.

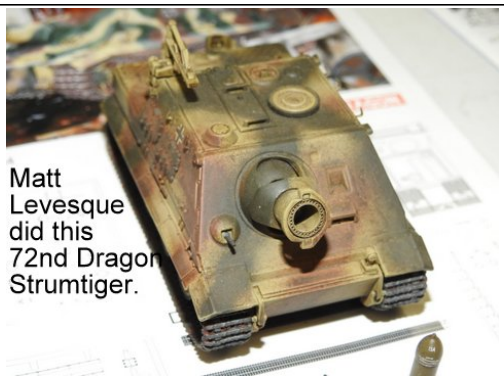

Dale Summers did this 35th Dragon T-80


Dale also did this T-80 U also a 35th Dragon Kit.


This one is Dale's 35th T-80 MBT by Dragon.


Dale Summer's Dragon T-72 M2 in 35th.


Matt Levesque's Sf.Kfz.171 Panther Ausf. F in 72nd.


Matt Levesque did this 72nd Dragon Strumtiger.


Mr.OTS,Matt Levesque did this 72nd Dragon Berg Tiger.

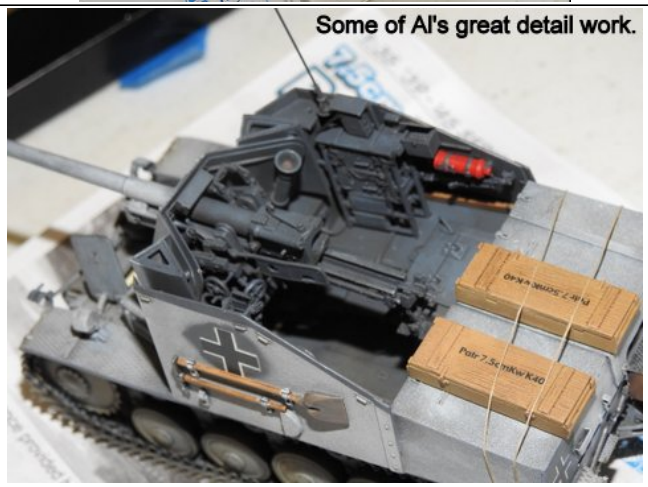

This is Matt's Sherman Firefly Vc. Dragon 72nd..What else? ?


Mike McTigue's Sd.Kfz. 7/2 3.2 Flak 37. A 35th Dragon kit.


Mike McTigue's "Kingtiger".


Mike McTige's Flak Panther also in 35th.


This is Al Gonzalez 35th Dagon Marder II.
Technical assistance provided by GARY EDMUNDSON

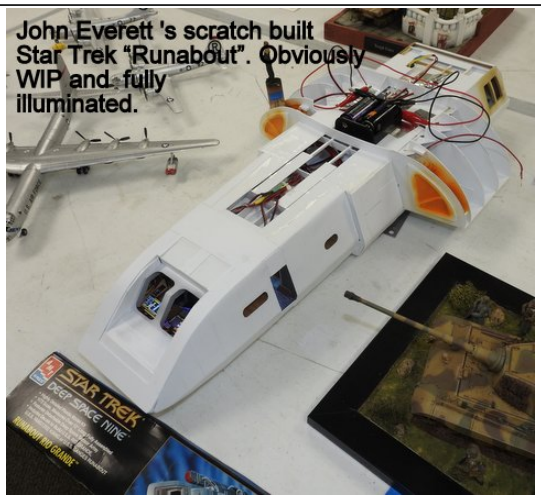

Some of Al's great detail work.


Mike McTigue did this Pz III. A Dragon 35th scale kit.


DRAGON
KIT NO.6257
Mike Mc Tigue's Sd.Kfz.234/3

Dan Gallegos 48th Tamiya Horsch 108, a conversion using an Ace Flak 30 completed since the last meeting.

This is John Everett's diorama "Tough Guys."



John Everett 's scratch built Star Trek "Runabout". Obviously WIP and fully illuminated.

A HALF CENTURY OF HALF AIRCRAFT CARRIERS

By David Axe, *War Is Boring*

Starting in the 1960s, the world's leading navies experimented with a new kind of warship. Heavily-armed and sporting huge flight decks for helicopters, the vessels were hybrids—not quite cruisers, not quite aircraft carriers.

Ungainly and in many cases conceptually flawed, the helicopter cruisers nevertheless represented an important leap forward for naval technology. Today's assault ships—arguably the most useful warships afloat—owe much to the helicopter cruisers that preceded them.

Above and at top—Jeanne D'Arc. French navy and U.S. Navy photos

'Jeanne D'Arc'

From their advent in the 1890s through World War II, cruisers—bigger and better-armed than

destroyers, smaller and faster than battleships—were screening, scouting and escort vessels. The development of helicopters in the late 1940s and early 1950s promised to expand the cruiser's roles to include anti-submarine warfare and amphibious assault.

The French were the first to seize upon this opportunity. In 1961, the French navy took the basic design of a *Colbert*-class anti-aircraft cruiser and added a 200-foot flight deck, a hangar below that and an aft elevator connecting the two. The resulting cruiser *Jeanne D'Arc,* commissioned in 1964, was the first of her kind—smaller and more heavily-armed than an aircraft carrier, but with more aviation capacity than a traditional destroyer or cruiser.

During her 46 years of service, the 13,000-ton helicopter cruiser *Jeanne D'Arc* alternated between three main missions—training naval cadets, anti-submarine warfare and assault. She could embark up to 10 helicopters to hunt subs and transport marines and commandos ashore. *Jeanne D'Arc*also boasted six Exocet anti-ship missiles and four 100-millimeter guns.

She saw combat just once. In 2008, Somali pirates kidnapped 30 people aboard the French yacht *Le Ponant*. *Jeanne D'Arc* was part of the rescue force. French agents paid a ransom to free the hostages. And then *Jeanne D'Arc* promptly launched a Gazelle helicopter that chased down the fleeing pirates and recovered the money.

Jeanne D'Arc decommissioned in 2010. Recognizing that aviation ships are most efficient when they emphasize, well, *aviation*, Paris replaced *Jeanne D'Arc* with larger *Mistral*-class assault ships featuring full-length flight decks, much bigger hangars … and virtually no weaponry.

Vittorio Veneto. Italian navy photo

'Andrea Doria' & 'Vittorio Veneto'

In building its own helicopter cruisers, the Italian navy made the mistake of going small. *Andrea Doria* and her sister ship *Caio Duilio*, both commissioned in 1964, displaced just 6,500 tons. Their aft flight decks were a modest 100 feet in length—adequate to support just four Sea King anti-submarine helicopters.

On the other hand, the *Andrea Doria* class boasted startlingly heavy weaponry for anti-sub vessels of their size—40 long-range surface-to-air missiles plus guns and torpedoes.

Still, Rome wanted a bigger helicopter cruiser and, in 1969, commissioned *Vittorio Veneto*, a variant of the *Andrea Doria* class displacing an extra 1,000 tons. *Vittorio Veneto* could support as many as nine Huey-size helicopters.

As happened in pretty much all navies, planners in the Italian navy conceded that aviation ships

should emphasize flight ops over other activities. The *Andrea Doria*s left service in 1991 and *Vittorio Veneto*followed in 2003.

The light carrier *Giuseppe Garibaldi* served as a replacement for the three until the assault ship *Cavour* joined the fleet in 2004 … and *Giuseppe Garibaldi* bowed out nine years later. The 24,000-ton *Cavour*'s biggest asset is her 800-foot flight deck, capable of supporting a dozen large helicopters plus eight Harrier jump jets.

Leningrad. Photo via Wikipedia

'Moskva' & 'Kiev'

In 1967 and 1968, the Soviet navy commissioned *Moskva* and *Leningrad*, which like *Jeanne D'Arc* sported the front half of a traditional cruiser with a large aft flight deck supporting as many as 18 helicopters.

The *Moskva*-class vessels, each displacing 17,000 tons, were primarily anti-submarine ships. Sailing from the Black Sea into the Mediterranean and the Atlantic, their main mission was to protect Soviet ballistic-missile subs from NATO's hunter-killer subs.

The copters were the cruisers' main sub-hunters, but the vessels backed up the rotorcraft with torpedoes and anti-submarine mortars of their own. The helicopter cruisers also packed 48 surface-to-air missiles and four 57-millimeter guns.

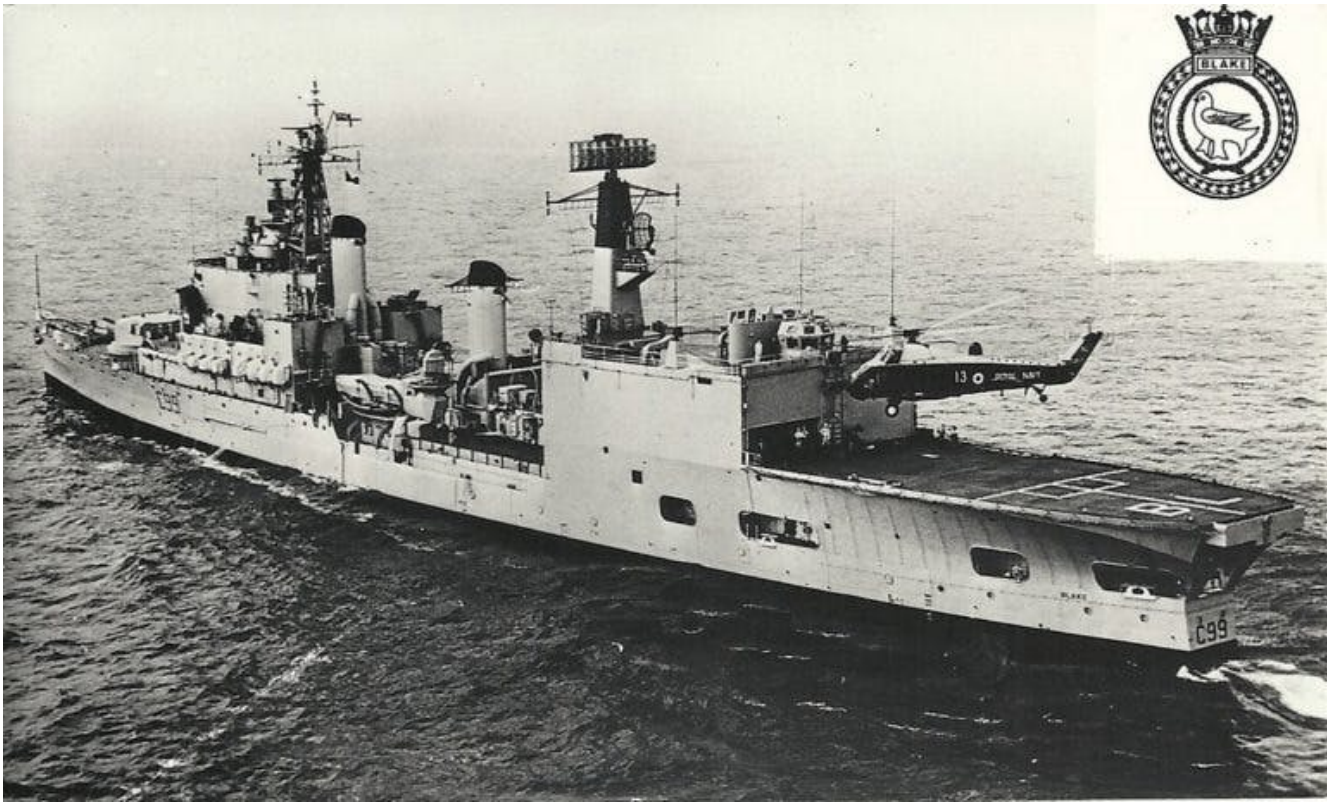
The ungainly, front-heavy *Moskva*s reportedly handled poorly in rough seas. The Soviets complemented the *Moskva*s with four much larger *Kiev*-class ships during the 1970s and '80s—and then decommissioned the two older ships in 1991.

Remarkably, the 45,000-ton-displacement *Kiev*s were more carrier *and*more cruiser. They supported roughly as many helicopters as the *Moskva*s did, but also added a dozen vertical-takeoff

Yak-38 light fighters plus heavier missile armament.

As budgets crashed in the 1990s, the Russian navy opted to decommission the *Kiev*s and maintain the fleet's only full aircraft carrier, the long-suffering *Admiral Kuznetsov*. Like the French had done, the Russians recognized that carriers shouldn't pretend to also be cruisers.

It's worth noting that when India bought one of the old *Kiev*s back in 2004, it paid Russia to rebuild the ship with a bigger flight deck and less weaponry, belatedly transforming the old aviation cruiser into an actual aircraft carrier.



Blake Royal Navy photo

'Tiger'

The British Royal Navy arrived late to the helicopter cruiser game. In the late 1960s, the Royal Navy began converting two 12,000-ton, World War II-vintage *Tiger*-class cruisers into helicopter carriers by replacing their aft gun turrets with flight decks and hangars.

The rework proved difficult. *Tiger* and her sister ship *Blake* returned to service in 1972 and 1969, respectively—and served for just a few years, supporting four Sea King helicopters on anti-submarine patrols.

The Royal Navy replaced *Tiger* and *Blake* with four *Invincible*-class assault ships starting in the mid-1970s. Twice as heavy as the old cruisers—and with 680-foot, full-length flight decks—the *Invincible*s could embark up to 22 aircraft including Sea Kings and Harriers.

London considered reactivating the old *Tiger*s during the 1982 Falklands War to help support Harrier ops, but ultimately concluded that the ships were too old, too small and too expensive owing to their aged, manpower-intensive systems.

Today the *Invincible*s are gone—the Harriers, too—and the Royal Navy relies on the solitary assault ship *Ocean* to sustain at-sea helicopter flights until two new *Queen Elizabeth*-class carriers enter service starting around 2020. British aviation ships after the *Tiger*s have one thing in

common. They're carriers *first*, with no heavy weaponry to get in the way of their flight decks.

Shirane ith a U.S. Navy destroyer. U.S. Navy photo

'Haruna' & 'Shirane'

After World War II, the Japanese navy gave up its aircraft carriers and reorganized into a strictly defensive force whose main mission is protecting the Japanese islands from submarine blockade.

In 1961, Tokyo proposed to build a class of small helicopter carriers, each displacing around 10,000 tons and embarking 18 anti-sub copters. But the so-called "CVH-B" ship startled the country's pacifist opposition groups—it was too similar to an offensive carrier.

So instead, the navy began building large helicopter destroyers that could support small numbers of rotorcraft without appearing to revive Imperial Japan's flattop fleet. Two *Haruna*-class helicopter destroyers—7,000 tons, room for three copters—entered service starting in 1973 and decommissioned in 2011.

Two slightly larger *Shirane*-class helicopter destroyers followed, beginning in 1980. The destroyers' armament included anti-air missiles, guns and torpedoes.

But what Japanese defense planners really wanted was dedicated helicopter carriers—bigger and optimized for flight ops. The result was the *Hyuga* class—two 19,000-ton carriers with 650-foot, full-length flight decks and capacity for 18 helicopters that began joining the fleet in 2006. The even bigger *Izumo* class is under construction.

Tokyo sidestepped the political opposition by calling the *Hyuga*s and *Izumo*s "helicopter destroyers." In the past, that designation made sense, as many copter carriers truly were cruisers, too.

Today, the half-cruiser-half-carrier of the mid-Cold War is an historical curiosity. The carrier half of the concept rightly took over.

RUSSIA'S SU-25: MOSCOW'S 'A-10' IS A VIRTUAL 'FLYING TANK'

By **Warrior Maven**

With the dissolution of the Soviet Union, Su-25s were passed onto the air services of all the Soviet successor states

You don't want to mess with this plane.

With the dissolution of the Soviet Union, Su-25s were passed onto the air services of all the Soviet successor states. Those that didn't use Su-25s in local wars—on both sides of the Nagorno-Karabakh conflict, for example—often exported them to countries that did. Frogfoots have seen action in the service of Macedonia (against Albanian rebels), Ethiopia (against Eritrea, with one shot down), Sudan (target: Darfur), and Georgia versus Abkhazian separatists that shot down several. And that list is not comprehensive Sébastien Roblin

The Su-25 Frogfoot , known as the Grach or "Rook" by Russian pilots, is one of those aircraft that may not be at the cutting edge of technology, but still has seen widespread service around the world because it offers an effective and useful solution to the need to blast targets on the ground.

As such, its obvious stablemate is the American A-10 Thunderbolt II attack plane. But while the U.S. Air Force wants to retire the A-10 starting in 2022, the Su-25 is undergoing extensive upgrades to keep with the times.

Also unlike the Thunderbolt, it has been disseminated it all over the world and seen action in over a dozen wars, including in the air campaigns over Syria, Iraq and Ukraine.

Not only has Russia had a lot of experience flying Su-25s in combat—it has shot several down as well.

During World War II, Russia's armored Il-2 Sturmovik attack planes, nicknamed "Flying Tanks," were renowned for their ability to take a pounding while dishing it out to German Panzer divisions with bombs, rockets and cannon fire.

Unlike the U.S. Air Force in the 1960s, which was enamored with the concept of "winning" nuclear wars with strategic bombers . the Soviet air service, the VVS, placed more emphasis on supporting ground armies in its Frontal Aviation branch. However, no worthy successor to the Shturmovik immediately appeared after World War II

In 1968, the VVS service decided it was time for another properly designed flying tank. After a three-way competition, the prototype submitted by Sukhoi was selected and the first Su-25 attack planes entered production in 1978 in a factory in Tbilisi, Georgia. Coincidentally, the American A-10 Thunderbolt had begun entering service a few years earlier.

Like the A-10, the Su-25 was all about winning a titanic clash between the ground forces of NATO and the Warsaw Pact by busting tanks and blasting infantry in Close Air Support missions. This meant flying low and slow to properly observe the battlefield and line up the plane for an attack run.

Flying low would also help the Su-25 avoid all the deadly long-range SAMs that would have been active in a European battlefield. However, this would have exposed it to all kinds of antiaircraft guns. Thus, the pilot of the Su-25 benefited from an "armored bathtub"—ten to twenty-five millimeters of armor plating that wrapped around the cockpit and even padded the pilot's headrest. It also had armored fuel tanks and redundant control schemes to increase the likelihood of surviving a hit. And in their extensive combat careers, Su-25s have survived some really bad hits [.

Despite the similarities with the A-10, the Su-25 is a smaller and lighter, and has a maximum speed fifty percent faster than the Thunderbolt's at around six hundred miles per hour. However, the Frogfoot has shorter range and loiter time, can only operate at half the altitude, and has a lighter maximum load of up to eight thousand pounds of munitions, compared to sixteen thousand on the Thunderbolt.

More importantly, the types of munitions *usually* carried are typically different. The Thunderbolt's mainstays are precision-guided munitions, especially Maverick] antitank missiles, as well as its monstrous, fast-firing GAU-8 cannon.

The Su-25's armament has typically consisted of unguided 250 or 500 kilogram bombs, cluster bombs and rockets. The rockets come in forms ranging from pods containing dozens of smaller 57- or 80-millimeter rockets, to five-shot 130-millimeter S-13 system, to large singular 240- or 330-millimeter rockets. The Su-25 also has a Gsh-30-2 30-millimeter cannon under the nose with 260 rounds of ammunition, though it doesn't have the absurd rate of fire of the GAU-8.

The lower tip of the Frogfoot's nose holds a glass-enclosed laser designator. Su-25s did make occasional use of Kh-25ML and Kh-29 laser guided missiles in Afghanistan to take out Mujahideen fortified caves, striking targets as far as five miles away. KAB-250 laser-guided bombs began to see use in Chechnya as well. However, use of such weapons was relatively rare. For example, they made up only 2 percent of munitions expended by the Russian Air Force in Chechnya.

The Su-25 was still packing plenty of antipersonnel firepower—and that's exactly what was called for when it first saw action in Afghanistan beginning in 1981. The Su-25 was the workhorse fixed-wing attack plane in the conflict, flying more than sixty thousand sorties in bombing raids on mujahedeen villages and mountain strongholds. They often teamed up with Mi-24 attack

helicopters to provide air support for Soviet armored units.

However, as the Afghan rebels began to acquire Stinger missiles from the United States, Su-25s began to suffer losses and the Soviet pilots were forced to fly higher to avoid the man-portable surface-to-air missiles. In all, some fifteen Su-25s were shot down in Afghanistan before the Soviet withdrawal.

With the dissolution of the Soviet Union, Su-25s were passed onto the air services of all the Soviet successor states. Those that didn't use Su-25s in local wars—on both sides of the Nagorno-Karabakh conflict, for example—often exported them to countries that did. Frogfoots have seen action in the service of Macedonia (against Albanian rebels), Ethiopia (against Eritrea, with one shot down), Sudan (target: Darfur), and Georgia versus Abkhazian separatists that shot down several. And that list is not comprehensive.

In one notable episode, Cote d'Ivoire acquired several Su-25s and used them in its civil war. When the government of President Laurent Gbagbo was angered by the perceived partisanship of French peacekeepers, his mercenary-piloted Su-25s bombed the French camp, killing nine. Whoever ordered the attack didn't consider that there was a French contingent stationed at the Yamoussoukro Airfield where the Frogfoots were based. The French used anti-tank missiles to destroy the fighter bombers on the ground in retaliation.

Russian Su-25 were back in action in the Chechnya campaign of 1994 to 1995, flying 5,300 strike sorties. Early on they helped wipe out Chechen aircraft on the ground and hit the Presidential Palace in Grozny with anti-concrete bombs. They then pursued a more general bombing campaign. Four were lost to missiles and flak. They were again prominent in the Second Chechen War in 1999, where only one was lost.

Of course, it's important to note at this juncture that the Su-25 is one of a handful of Soviet aircraft that received its own American computer game in 1990.

Modern Su-25s

In addition to the base model, the Frogfoot also came in an export variant, the Su-25K, and a variety of two-seat trainers with a hunchback canopy, including the combat-capable Su-25UBM.

There were a number of projects to modernize the Su-25, including small productions runs of Su-25T and Su-25TM tank busters. But the Russian Air Force finally selected the Su-25SM in the early 2000s for all future modernization.

The SM has a new BARS satellite navigation/attack system, which allows for more precise targeting, as well as a whole slew of improved avionics such as news heads-up displays (HUDS), Radar Warning Receivers and the like. The Su-25SM can use the excellent R-73 short-range air-to-air missile, and has improved targeting abilities for laser-guided bombs. Other improvements reduce maintenance requirements and lower aircraft weight.

The National Interest's Dave Majumdar has written about the latest SM3 upgrade [6], which includes the capacity to fire Kh-58 anti-radar missiles, which could enable Su-25s to help suppress enemy air defenses, as well as a *Vitebsk* electronic-countermeasure system that could increase its survivability against both radar- and infarred-guided surface to air missiles.

Georgia and Ukraine also have limited numbers of their own domestically upgrade variants, the Su-25KM and the Su-25M1 respectively. You can check out the Su-25KM variant, produced with an Israeli firm, in this video full of unironic 1980s flair.

Speaking of Georgia, things got messy in 2008 when *both* Russia and Georgia operated Frogfoots in the Russo-Georgian War. The Georgian Frogfoots provided air support for Georgian troops seizing the city of Tskhinvali. Then *Russian* Su-25s assisted Russian armor in blasting them out. Russia lost three Su-25s to MANPADS—two likely from friendly fire—and Georgia lost a similar

number to Russian SAMs. To the surprise of observers, however, the Russian Air Force did not succeed in sweeping Georgian aviation from the sky.

In 2014, Ukraine deployed its Frogfoots to support ground forces combating separatist rebels in Eastern Ukraine. They assisted in the initial recapture of the Donetsk airport in May, would be followed over a half year of seesaw battles ending in a separatist victory in 2015. Ukraine lost four Su-25s in the ensuing ground-attack missions—three were hit by missiles (one MANPADS, two allegedly by longer-ranged systems across the Russian border), and a fourth was reportedly downed by a Russian MiG-29. Two others *survived* hits from missiles. As a result, Su-25 strikes were sharply curtailed to avoid incurring further losses.

In 2015, the Russian separatists of the Luhansk People's Republicclaimed to have launched airstrikes with an Su-25 of their own. Depending on who you ask, the airplane was restored from a museum or flew in from Russia.

The Iraqi Air Force has deployed its own Su-25s in the war against ISIS, purchasing five from Russia in 2014 and receiving seven from Iran that had been impounded during the 1991 Gulf War.

Finally, in the fall of 2015, Russia deployed a dozen modernized Su-25SMs in support of the Syrian government of Bashar al-Assad. Many observers noted that of the aircraft involved in the mission, the Su-25s were the best adapted for the close air-support role . The Frogfoot flew 1,600 sorties against rebel-held Syrian cities, and expended more than six thousand munitions, mostly unguided bombs and S-13 rockets. They were withdrawn this year, leaving attack helicopter behind to perform more precise—and risky—close air support missions.

Lessons Learned from Flying Tanks?

While it's fun to admire high-performing fighters like the MiG-29 or F-22 Raptor , the unglamorous Su-25 has so far had a greater impact on a wide range of conflicts. We can draw a few lessons from its recent combat record.

First, the significant losses suffered by Su-25s demonstrate that without effective air-defense suppression and electronic counter-measures, low-and-slow ground support planes are poised to take heavy losses against Russian-made surface-to-air missiles deployed in sufficient numbers.

Second, observation of Russia's Syrian contingent suggests that despite possessing a diverse arsenal of precision guided munitions, the Russian Air Force continues to rely primarily on unguided bombs and rockets for the close air support mission.

Lastly, aircraft capable of delivering punishing attacks on ground targets while retaining a good chance of surviving hits taken in return are going to remain in high demand worldwide.

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This appeared in 2016 and is being reposted due to reader interest.

THE U.S. COAST GUARD COULD ARM ITS NEW ICEBREAKERS OR NOT

Mellon fires a Harpoon in 1990.

FEATUREDWIB SEA January 31, 2018 David Axe

U.S. Coast Guard1

The U.S. Coast Guard's new icebreakers will have space, displacement and electric power for weapons when they enter service starting around 2023, Coast Guard commandant Paul Zukunft said.

The coastal law-enforcement agency hasn't decided yet whether to actually add the weapons. Zukunft said that depends on whether the United States, Russia and other countries continue to cooperate in the Arctic and Antarctic regions — or clash over polar shipping lanes, fisheries and mineral resources.

The Coast Guard wants to be able to "fully weaponize these [ships] and make these a capable platform offensively in the event this world changes in the next five, 10, even 15 years from now," Zukunft **said** at the Surface Navy Association conference in Virginia in January 2018. "You can't project out the status quo."

Zukunft's announcement confirmed long-running rumors that the Coast Guard's new icebreakers could eventually be armed with surface-to-surface missiles or other heavy munitions.

The Coast Guard is building up to six new icebreakers to replace the 42-year-old *Polar Star*, which at 14,000 tons displacement is the only heavy icebreaker currently in U.S. government service. Capable of cracking ice up to 21 feet thick, *Polar Star* is the only U.S. vessel capable of carving a path to America's Antarctic research station.

The Coast Guard also operates one medium icebreaker, the 11,000-ton *Healy*. Commissioned in 1999, *Healy* can crack ice up to 10 feet thick. The two icebreakers may carry small arms and support Coast Guard helicopters, but are otherwise weaponless.

Polar Star. U.S. Coast Guard photos

If the new icebreakers do eventually get cruises missiles, they would likely be the most heavily-armed ships in the Coast Guard fleet. In 1990, the Coast Guard test-fired a single Harpoon anti-ship missile from the *Hamilton*-class heavy patrol cutter *Mellon*.

The heaviest weapons currently in the Coast Guard's inventory are the 75- and 57-millimeter cannons on the *Hamilton*s and *Legend*-class cutters. The Coast Guard is building nine of the 4,500-ton-displacement *Legend*s to replace the dozen, 3,300-ton *Hamilton*s.

Zukunft didn't say which weapons the Coast Guard has in mind for the new icebreakers, the first of which could end up costing $1 billion. The U.S. Navy is paying for the first new icebreaker. The Department of Homeland Security, the Coast Guard's parent agency, will likely cover the cost of subsequent icebreakers.

The Navy's own warships are compatible with a range of anti-ship missiles, including the latest versions of the Harpoon, an anti-ship variant of the Tomahawk cruise missile and the new, stealthy Long-Range Anti-Ship Missile.

Zukunft said the Coast Guard would add canister launchers to the icebreakers' decks, rather than install below-deck vertical-launch cells as are standard on most Navy surface warships. Any missile

system the coastal agency adds to the new icebreakers will have to be modular, requiring only minimal modification to the host vessels, Zukunft said.

It's unclear what sensors the new icebreakers will carry. In the absence of long-range surface-search radars, the polar vessels might rely on aircraft, satellites or other ships to provide targeting data for their missiles.

Russia and Canada are also building armed icebreakers. Zukunft said he's encouraging America's allies and rivals alike to keep large naval vessels out of the Arctic and Antarctic regions. Instead, Zukunft said, only modestly-armed coast guard ships should patrol the poles.

CHINA PLANS SEA-BASED ANTI-MISSILE SHIELDS 'FOR ASIA-PACIFIC AND INDIAN OCEAN

South China Morning Post ^ | 08 February, 2018 | Minnie Chan

China is developing sea-based anti-missile systems and plans to deploy them in the Asia-Pacific and Indian Ocean, according to military experts. The assessment came as Beijing announced it had carried out a successful test of its ground-based mid-course defence system on Monday.

Testing of the anti-ballistic missile system that could shield China from a ballistic missile attack is part of efforts to catch up with the top nuclear nations with anti-missile technology, the United States and Russia. China previously carried out tests of the system in 2010 and 2013.

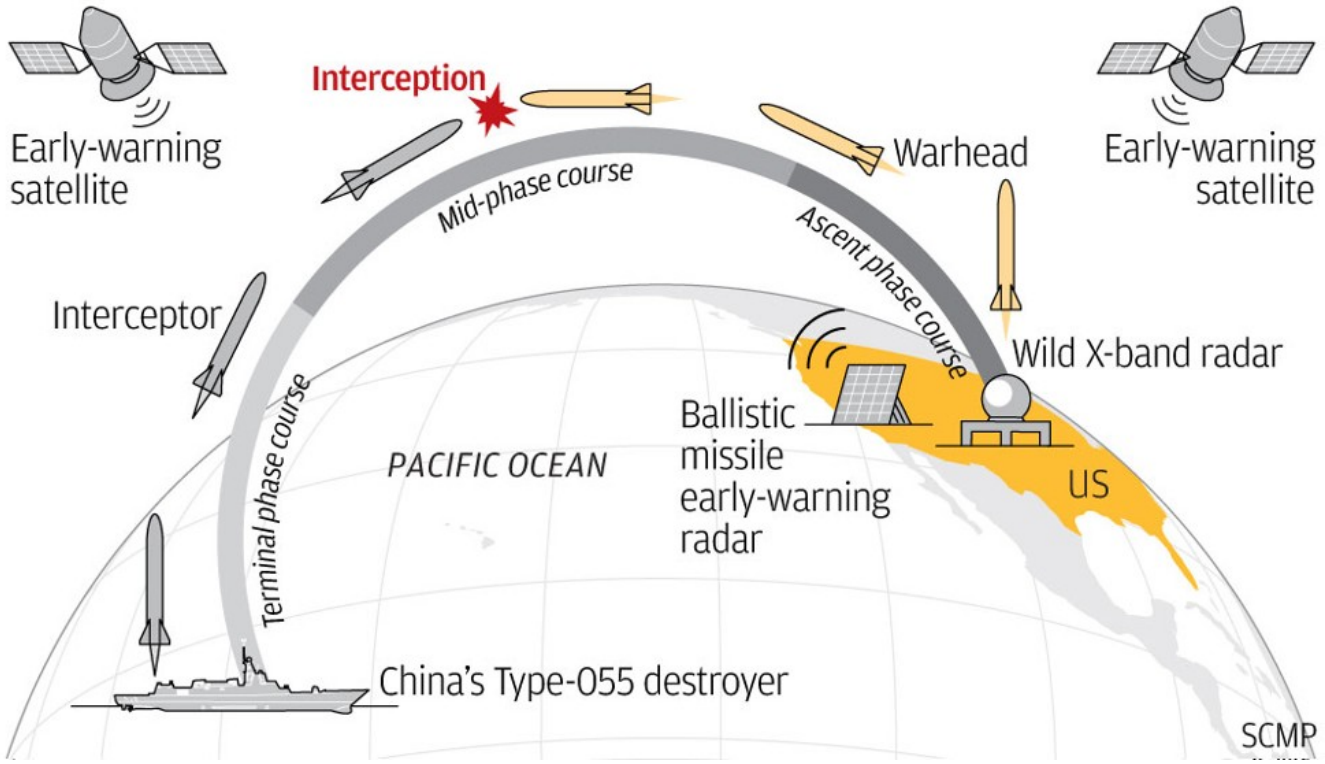
Beijing is also working on a sea-based system for the Asia-Pacific region to breach the cold war era line of containment, according to observers. The "first island chain" is a series of archipelagos lying between China and the world's largest ocean that Beijing says has been used by the United States as a natural barrier to contain it since the cold war.

"China's sea-based anti-missile system aims to defend both its territory and overseas interests, because sea-based defence systems will be set up wherever its warships can go," said Song Zhongping, a military commentator on Phoenix Television. "The first area it will target is the Asia-Pacific region and the Indian Ocean to protect its overseas interests."

China has been trying to build up a blue-water navy that can operate globally and safeguard its maritime interests. Observers have said Beijing plans to have four aircraft carrier battle groups in service by 2030. And with three-quarters of its oil imports passing through the Indian Ocean or Strait of Malacca, Beijing is looking to boost maritime defence.

"With the US and other countries taking on the Indo-Pacific strategy to counter China, Beijing will definitely deploy anti-missile systems in these areas in response," said Song, a former member of the People's Liberation Army's Second Artillery Corps.

Macau-based military expert Antony Wong Dong said China had developed a new generation sea-based HQ-26 anti-missile system with an ultra long-range 3,500km cruise missile. The system is expected to be installed on the country's biggest destroyer, the Type 055, which has a maximum displacement of 13,500 tonnes.



Beijing-based naval expert Li Jie said sea-based mid-course interceptors were designed to destroy enemy warheads in space, which is not covered by international law.

The latest mid-course anti-missile test was conducted amid simmering tensions over North Korea's nuclear ambitions and rising concerns about India's growing missile capabilities. Military analyst Zhou Chenming said Beijing was sending a message that they were still relatively small nuclear nations.

India successfully tested an Agni-V intercontinental ballistic missile (ICBM) on January 18 that, with a range of 5,000km, could land a nuclear warhead almost anywhere on the Chinese mainland.

And in November, North Korea claimed to have successfully launched a Hwasong-15 ICBM with an estimated range of 13,000km – meaning it could land a nuclear warhead on the US mainland.

"China's mid-course anti-missile system is powerful enough to shoot down missiles from North Korea and India, though it's not clear whether it could intercept an ICBM from the US if they start firing at each other," Zhou said.

He added that China needed anti-missile shields to defend itself.

"The US ... owns 6,800 nuclear warheads, while China has just a few hundred – that's why Beijing needs to develop anti-missile systems for defence," Zhou said.

This article appeared in the South China Morning Post print edition as: China 'planning anti-missile shields across two oceans'China plans anti-missile defence system

FINLAND IS BOLSTERING ITS NAVY WITH AMERICAN MISSILES

Corvettes to pack anti-air ESSMs and anti-ship Harpoons

the Finnish 'Hamina'-class missile boat 'Tornio.' Photo via Wikimedia

WIB SEA February 7, 2018 Robert Beckhusen

Finland6

Finland's tiny navy will face a crisis in the mid-2020s as half its surface combat fleet — four of eight missile boats in total — retires. To prevent this crisis, the navy is upgrading is planning to build four corvettes which are larger than anything currently in the fleet, and arm them with American anti-air and anti-ship missiles.

In February 2018, the U.S. State Department **approved** a $112 million sale for 68 RIM-162 Evolved SeaSparrow missiles, or ESSMs, for the future corvette, part of the Squadron 2020 project. The Finnish military has U.S.-made fighter jets, shoulder-launched anti-aircraft missiles and rocket launchers, but has tended to buy European weapons.

An officially neutral country, it's noteworthy Finland is seeking American missiles for its navy during a period of heightened tension with Russia, as that carries with it political implications.

The Finnish navy is small — some 3,500 sailors, 1,900 of whom are conscripts — but has little area to cover. Its focus is on coastal defense and the protection of merchant shipping, which is vitally important to the Finnish economy and society.

Finland's historic and most likely future threat, Russia, looms so large that Finnish strategy is two-pronged — i.e. avoid giving Russia the perception that Finnish territory will be used against it, while secondly, having enough military power to raise the cost of an invasion from Russia or anywhere else. Hence, Finland practices conscription, and is not part of NATO.

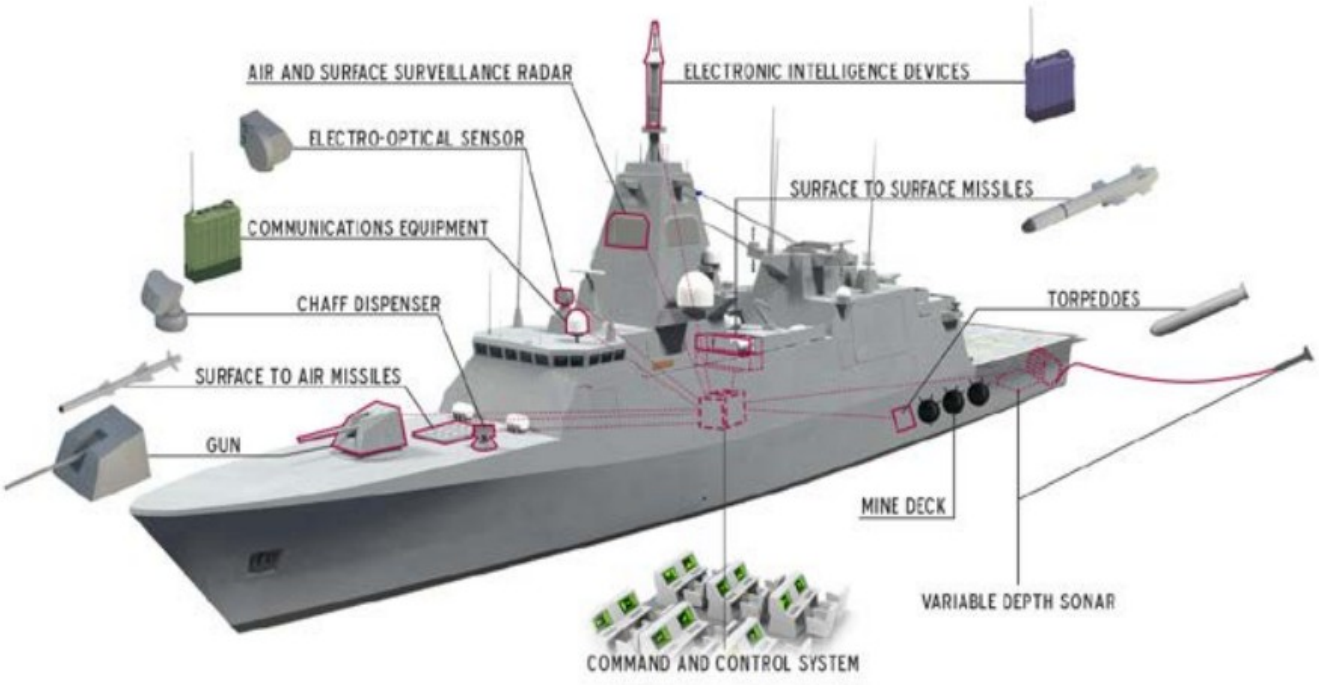
Squadron 2020 corvette. Finnish Defense Forces illustration.

Likewise, the Finnish navy has few ships, but it has enough to at least complicate an invader's plans. The core of the surface fleet is built around eight missile boats — four 250-ton *Rauma* class and four newer 240-ton *Hamina*-class boats — and five minelayers.

Another 10 minesweepers, and a few dozen landing craft and logistical support ships round out the force.

These minelayers and their munitions would be a threat to vessels operating in the narrow Gulf of Finland, and the many fjords — or *vuonot* in Finnish — along the Finnish coast provide many places for small surface craft to hide. Shallow waters help keep out submarines, of which the Finnish navy possess none.

The Raumas, though, getting old, and are effectively out of commission already due to hull fatigue. In the early 2020s, they will retire. In their place will come the four Squadron 2020 multi-role corvettes. These will be much larger — at more than 100 meters long and with a 3,000-ton displacement — and more capable, serving for more than three decades once their planned introduction in the mid-late 2020s.



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uadron 2020 corvette concept. Finnish Defense Forces illustration

The RIM-162 ESSM will also give the corvettes a modern anti-air and anti-missile weapon with greater range, speed and capabilities than the *Hamina*'s current South African Umkhonto-IR anti-air missile, which uses an infrared rather than a semi-active radar homing seeker. Radar-guided missiles such as the ESSM are more powerful, and offer superior range, accuracy and reliability when facing enemy countermeasures.

With 17 MK25 canisters on order and 68 missiles, it makes one wonder whether Finland aims to fit four canisters on each corvette, for a total of 16 ESSM missiles per vessel — an impressive amount for a warship in that class. The Finnish navy also wants its future corvettes to have mine-laying capabilities, torpedoes and surface-to-surface missiles.

The minelaying capability aboard the future corvette is important, as two *Hameenamaa*-class minelayers will retire early next decade.

The surface-to-surface missiles will likely be U.S.-made Harpoon missiles. In February 2018, the U.S. State Department approved a **possible sale** of 100 RGM-84Q-4 Harpoon Block IIs for the Finnish corvettes, coastal batteries and the *Haninas*, likely replacing the latter's Swedish RBS-15 anti-ship missiles.

All together, it's nowhere near enough to stop the full weight of the Russian military, but it's enough to make an invasion hurt — which is precisely the point of deterrence. A missile boat hiding in a *vuono* and armed with Harpoon missiles can present a nasty surprise to a Russian destroyer.

And it's important to remember that Finland doesn't imagine going to conflict alone, but being thrust *into* a conflict against its will due to a larger geopolitical eruption. This means that war with Finland would likely involve a Russian Baltic Fleet — already not in great shape — facing many enemies at once.

Finnish corvettes with modern missiles, even if there are only four of them, makes the Russian fleet's job a bit harder.

THE SUPER HIND MK.III COULD BE THE BEST MI-24 EVER

War is Boring ^ | February 6, 2018 | Tom Cooper

Some 50 air forces and air arms around the world operate different variants of the famous Mil Mi-24 Hind attack helicopter. Market for upgrades of this type is therefore huge – and the competition is correspondingly fierce.

The best-known upgrades for Mi-24s are offered by different Russian and Czech companies, but also by the Israeli Aircraft Industries, WZL in Poland and SAGEM in France.

However, one of the least-well-known yet biggest and most successful upgrades of Mi-24s ever was launched by the South African company called Advanced Technologies and Engineering. The Super Hind upgrade in question resulted in spectacular modifications to the original airframe.

However, for reasons related to the small size, and thus the influence, of the company in question — as well as its binding to strict confidentiality agreements with customers and fierce competition from Europe and Russia — the project nearly killed the company.

Originally, ATE was a group of small private enterprises based in Midrand, South Africa, that used to be involved in management of defense programs, with a focus on integration of avionics and weapons systems on military aircraft.

In two decades of existence, ATE became involved in development of several programs, including avionics- and weapons-integration for Spanish Mirage F.1 fighter-bombers and South African PC-7 Mk.II turboprop trainers and the development of systems for the South African Rooivalk attack helicopter.

Having successfully completed the work on the Rooivalk, the ATE first took interest in the Mi-24 in 1996. As of the time, dozens of Mi-24s had been acquired by multiple air forces in Africa, Asia and Latin America.

ATE purchased two for itself — these received the registrations ZU-BOI and ZU-GAL — and began the work on determining their flight envelope and operational characteristics. Subsequently, the company began adding modifications, progressively developing upgrade packages designated Super Hind Mk.II, Mk.III, Mk.IV and Mk.V.

Unlike other companies offering similar upgrades, the ATE didn't retain the original navigational and attack suites while loading the airframe with additional equipment. Instead, it first focused on that type's deficiencies in regards of night-combat capabilities, fire-power, reliability and troublesome and expensive logistics.

Furthermore, during the flight testing in 1999 the South Africans found out that Mi-24 was much overweight, which in turn reduced its agility. Finally, the ATE's engineers concluded that the further work on Super Hind would have to be cost-effective, include little or no development risks and be fast-tracked.

At least 30 Super Hinds Mk.IIIs remain in service with two squadrons of the Algerian air force's 1st Combat Helicopter Regiment based at Biskra air base. ATE photos Their ideas attracted attention of the Algerian air force which in 1999 placed an order for the upgrade of 34 of its Mi-24 to the Super Hind Mk.II standard. This was a low-cost version retaining Soviet-built weapons system, but replacing existing aiming systems with latest South African technology.

In the course of related negotiations and further testing, the Algerians became attracted by the much more advanced Super Hind Mk.III configuration. This included a removal of most of obsolete, Soviet-made avionics — only the air data system, rate gyros and radar altimeter were retained. This resulted in weight reduction of more than 1,800 kilograms.

Instead, the South Africans installed a digital computer core, a new Doppler radar, GPS-assisted navigational system, the ARINC Mil-Std 1553 data-bus, the Carl Zeiss Optronics Argos 410-Z airborne observation system turret, a dual-feed, hydraulically driven Vektor F2 chain turret with a 20-millimeter GIAT cannon and South African-made ZT-3 Ingwe anti-tank guided missiles.

Finally, helping Algerians solve often problematic supply of spare parts, ATE tackled the issue of logistics and relatively complex maintenance. The company made the Super Hind Mk.III user-friendly and maintainable even under most primitive conditions and helped Algerians obtain ability to completely overhaul their Super Hinds at home.

Delighted by results, the Algerians re-negotiated their order and had all 34 Mi-24s upgraded to Mk.III standard. While some of work was undertaken in South Africa, much of it was completed in Algeria.

Super Hinds entered service in 2001. Although one helicopter was written off after an early training accident, the project proved successful beyond the imagination of most of the people involved. Several of Algerian pilots commented that they experienced no problems while re-qualifying, and pointed out the seamless integration of new components with the original helicopter as the reason for success of the project.

Furthermore, they stressed, the weight savings considerably improved the 'hot & high' performance of the Super Hind. Before soon, the type was blooded in combat against Islamist extremists in southern Algeria, and proved lethal beyond any doubt – especially by night.

Unsurprisingly, the Super Hind Mk.III attracted lots of public attention abroad. Emboldened, the ATE offered it to a number of East European air forces that were in the process of joining the

NATO. At the same time, it intensified further research and development of more advanced variants, and began considering similar upgrades for the Mil Mi-8s and Mi-17s.

That's when the troubles began. The Russians fell all over ATE. According to some contemporary Russian commentators, the Super Hind Mk.III was "dangerous to fly." South African inventions would "place Algerian crews at great risk."

Ironically, while explaining that the South African modification of the Mi-24 was "little else but taking pieces from Rooivalk and putting them into the Super Hind," the Russians launched an effort to obtain the best available information about ATE-applied modifications.

Failure of negotiations with Bulgaria and expenses for further research and development of the Super Hind drove the ATE to the verge of bankruptcy. The company then entered cooperation with the Ukrainian AVIAKON but Ukraine placed no orders. Only Azerbaijan opted to upgrade its Mi-24s to the Super Hind Mk. III standard in Ukraine – the source for its original 10 Mi-24s.

Even then, in an effort to save money, the Azerbaijanis selected a variant deploying Ukrainian weapons, instead of south African. Orders from several other potential customers failed to materialize. A number of these – Nigeria included – opted for much more expensive, yet far less efficient orders in Europe, instead.

Eventually, ATE was acquired by Paramount. This company then entered into cooperation with Yakovlev. As could have been expected, the Russians proved not the least interested in further marketing of this project.

Algeria and Azerbaijan thus remain the only users of the Super Hind – probably the most successful, and certainly the most spectacular, upgrade of the venerable Mi-24.

ARMED BLACK HAWK COMPLETES QUALIFICATION

AIN online ^ | February 6, 2018 | David Donald

The UAE is the launch customer for Sikorsky's armed Black Hawk.

Sikorsky (a unit of Lockheed Martin, Chalet CS02) has completed the six-year development and qualification program for its weaponization kit, tailored for the S-70i/UH-60M Black Hawk. The qualification involved around two years of live firing trials conducted at the Yuma Proving Ground in Arizona.

Using the Black Hawk's existing digital avionics, the kit allows a range of weaponry to be launched and fired, including precision-guided Hellfire missiles and laser-guided rockets. The system also provides accurate aiming for unguided weapons such as Hydra 70 rockets carried in seven- or 19-round launchers, and forward-firing .50 caliber machine guns. In addition, the system supports the operation of 7.62mm guns mounted in the cabin windows that can be fixed to fire forward under pilot operation, or when flex-mounted, as crew-served guns.

Apart from the window guns, weapons are carried on external wings mounted on the fuselage side and each equipped with two hardpoints. An electro-optic/infrared sensor/laser designator turret provides accurate targeting to both pilots through a helmet-mounted display. The complex ballistics are calculated by the system to generate aiming cues in the helmet display, facilitating the task of rapidly bringing weapons to bear.

A number of configurations have been qualified, including an anti-armor loadout with 16 laser-guided missiles such as Hellfire. For long-endurance missions, the UH-60M can carry a full external weapons load with ammunition pallets and an auxiliary fuel tank in the cabin. In the transport role, the UH-60M can seat 10 troops with two window gunners.

Arming Black Hawks is not a new idea, with earlier generations of the UH-60 having been armed for U.S. special forces duty, and as the UH-60L Arpia III for Colombia. The launch customer for the Sikorsky kit is the UAE, which announced an order for arming 24 of its UH-60Ms in 2011. A number of existing and potential users have expressed interest in the Armed Black Hawk, including Tunisia.

WWII AIR WAR - RUSSIA VS NAZIS
STALINGRAD

WWII Air War - Russia vs Nazis - Stalingrad

The actual translation of Lydia Vladimirovna Litvyak's epic nickname might be "The White Lily of Stalingrad"

By Blake Stilwell We Are The Mighty

Depending on the language you speak. Considering the Lily's association with death and funerals, it's rather fitting for such an incredible pilot.

Litvyak was only 20 years old when Hitler launched Operation Barbarossa, the Nazi invasion of the Soviet Union. The young girl rushed to the recruiter and tried to join to be a fighter pilot. The recruiters sent her packing. In their minds, she was just a small, young girl.

In truth, she was flying solo at 15 and was an experienced pilot. A biographer estimated she trained more than 45 pilots on her own. She knew she could do this. So instead of giving up, she went to another recruiter and lied about her flying experience, by more than a hundred hours. That did the trick.

The Soviets, probably realizing that this fight was going to kill a lot of Soviet people (and it did, to the tune of 27 million), were foresighted enough to consider gender equality when it came to their military units. Where American women pilots were only allowed to transport planes, Stalin was forming three fighter regiments of all-female pilots.

Seriously though, good for Russia.

During her two years of wartime service, she racked up 12 solo kills and four shared kills over 66 combat missions. She scored her first two kills over Stalingrad three days after her arrival in the area.

Young Lydia Litvyak flew a few missions with the all-female unit before transferring to a mixed-gender unit — over Stalingrad. It was here she earned her illustrious moniker, "The White Rose of Stalingrad." She flew around a hail of anti-aircraft fire to engage an artillery observation balloon from the rear. She shot it down in a blaze of hydrogen-fueled mayhem — a notoriously difficult task for any pilot.

Good thing Lydia Litvyak wasn't just any pilot.

Litvyak wasn't finished; she later became one of two women to be crowned "first female fighter ace" as well. She wasn't flawless — she was shot down more than once and bled more than her share over Russian soil.

But even when forced to make belly landings, she hopped right back into the closest cockpit.

She was so good, the Russian command chose her to be Okhotniki, — or "free hunter" — a new tactic that involved two experienced pilots who were free to hunt the skies on seek and destroy missions. She terrorized German pilots all over the Eastern Front.

The Yakovlev Yak-1, a plane flown by Soviet fighters, including Lydia Litvyak.

"The White Rose of Stalingrad" was last seen being chased by eight Nazi ME-109 fighters on an escort mission south of Moscow. Her body was lost until 1989 when historians discovered the unmarked grave of a female pilot in the Russian village of Dmytrivka.

The next year, Soviet Premier Mikhail Gorbachev awarded Lydia Vladimirovna Litvyak the title "Hero of the Soviet Union," the USSR's highest military honor.