

Putin's War, A European tragedy



Andrea Uolmi

& The strategic impact of Air Denial

ACdre. Prof. Dr. Frans Osinga

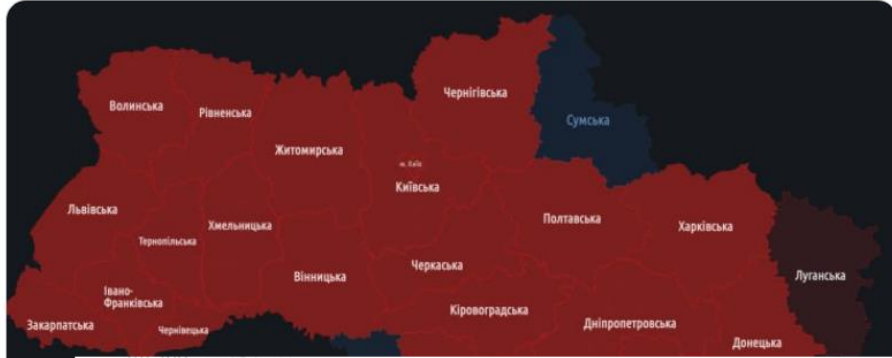


Air raid alert all over Ukraine.

Threats of a massive Russian rocket attack.

All in Ukraine advised to stay in shelters.

#RussiansATerroristState



Russia 'fired over 50 missiles at Ukraine today'

Russia launched more than 50 missiles at **Ukraine** today, prime minister **Denys Shmyhal** has said, adding that most of those missiles were shot down.

Posting to Telegram, the Ukrainian PM said:

🚩 *Russia cannot accept failures and therefore continues to terrorise the (Ukrainian) population. Another attempt (on Friday) to destroy the Ukrainian energy system and deprive Ukrainians of light, heat, and water.*

Meanwhile, Ukraine's air force has said it shot down 61 of 71 Russian cruise missiles today. It said **Russia** had used eight Tu-95MS strategic bombers, and that they had fired X-101 and X-555 missiles from the Caspian Sea and the city of Volgodonsk in Russia.

A Telegram update from the air force said:

Visit to London an 'important step' on road to fighter jets



Михайло Подоляк

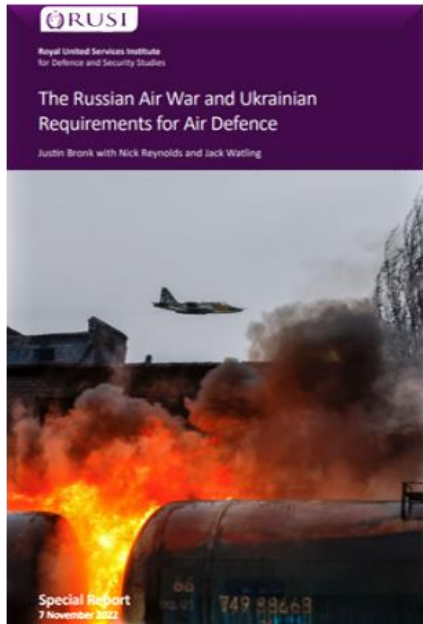
@Podolyak_M · Follow

RF has been striking at 🇺🇦 cities all night & morning. RF's intention is the same: mass destruction & killing. Enough talk & political hesitation. Only fast key decisions: long-range missiles, fighter jets, operational supplies logistics for 🇺🇦. Or else genocide can't be stopped.

10:12 AM · Feb 10, 2023



Opening shots: the strategic impact of Air Denial



“From early March, the VKS lost the ability to operate in Ukrainian-controlled airspace except at very low altitudes due to its inability to reliably suppress or destroy increasingly effective, well-dispersed and mobile Ukrainian surface-to-air missile (SAM) systems.”

“It is purely thanks to its failure to destroy Ukraine’s mobile SAM systems that Russia remains unable to effectively employ the potentially heavy and efficient aerial firepower of its fixed-wing bomber and multi-role fighter fleets to bombard Ukrainian strategic targets and frontline positions from medium altitude, as it did in Syria.”



Russia's missile deployment in Kaliningrad ups the stakes for Nato

[Jonathan Marcus](#) Diplomatic correspondent

9 October 2016



Military Capabilities

AFA 2015: Russia has closed air power gap with NATO, US warns

Marina Malenic, Washington, DC - IHS Jane's Defence Weekly, 16 September 2015

ISW
INSTITUTE FOR THE
STUDY OF WAR

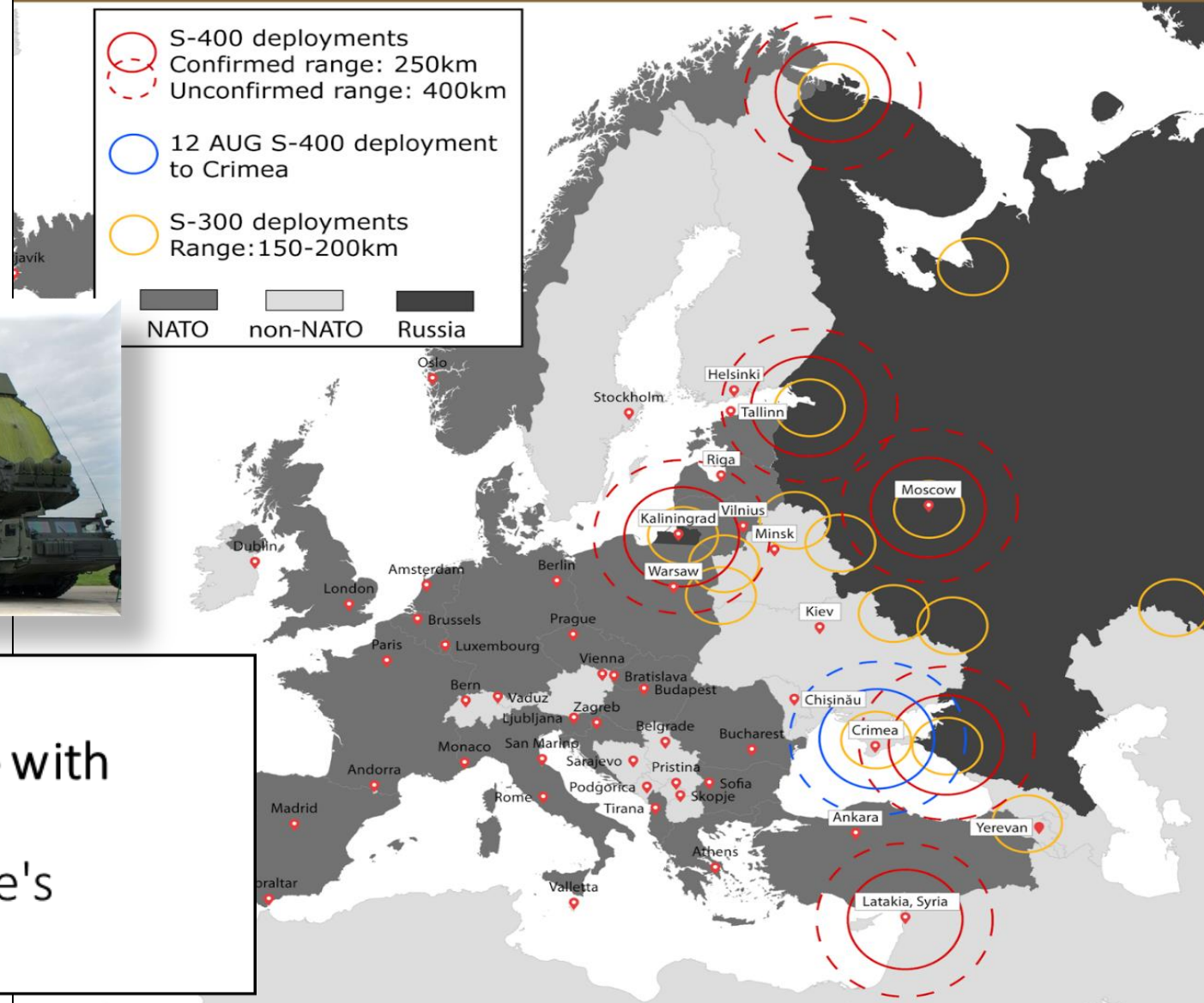
Russian Anti-Access and Area Denial (A2AD) Range: August 2016

S-400 deployments
Confirmed range: 250km
Unconfirmed range: 400km

12 AUG S-400 deployment to Crimea

S-300 deployments
Range: 150-200km

NATO non-NATO Russia



The challenges of A2AD: credible NATO deterrence posture?

- insufficient in-place ground forces: just tripwire
- Shortage of deep strike, SEAD, ISR, EW assets
- Air & missile defence scarce
- Lack of air superiority 4th Gen Fgts vis a vis Ru SAMs
- air support to ground problematic
- Questionable credibility of conventional deterrence & collective defence
- Default posture: Deterrence by punishment
- Vulnerable for Ru limited probe



Ukr also got lucky; Ru Failed Initial Campaign

- 10 day Blitzkrieg stype campaign, no long term plans
- Flawed assumptions
 - Low troops density, 4 fronts
 - Units not prepared for intense combat ops
- Only short SA & OCA campaign
- Poor Joint Warfare Skills
 - RU uncoordinated infantry-armor ops results in many losses
 - RU uncoordinated airmobile ops into defended airfields
 - RU fails to gain air superiority
 - lack of air-land coordination
 - Mounting losses: 88 a/c & heli, 2000 casualties week 1

Why the first few days of war in Ukraine went badly for Russia

Russia banked on Kyiv falling quickly. Here's why it hasn't.

By Zack Beauchamp | @zackbeauchamp | zack@vox.com | Feb 28, 2022, 6:50pm EST

Battle for Kyiv: Ukrainian valor, Russian blunders combined to save the capital



Russia's failed air war Feb-April

- OCA & DCA day 1-3
 - EW, Air Strikes, CM & BMs against Early Warning rdrs, fixed AD sites
 - limited OCA & SEAD ops after day 3, shift to ground support
 - Effective use of Ru CAPs with long range missiles, outclass old Ukr fighters
- Ukrainian Air Defence After day 1-3:
 - dispersal, air denial, combi GBAD & fighters
 - Jamming of Ru SAMs & comms
 - After March: increasing attrition on Ru fighters
 - Air denial effective: offers freedom of maneuver for Ukr army



Russia's failed air war Feb-April

- Low effectiveness Ru air strikes
 - Single sorties/pairs
 - Low PGM stocks, use unguided ammo from med altitude
 - Target intel issues & Poor target acquisition & aiming tech
- CAS
 - lack of training
 - Air-land Comms & coordination problems
 - Risky Lo lvl tactics limit strike effectiveness
- Increasing # city bombing sorties
- Low sortie rates: initially 140, later 250-300/day



Mar-Jun: Air Denial against Infra attacks

- Limited impact,
 - late in war
 - Low Ru stockpiles: intensity & frequency limited
 - Alternatives offer only limited accuracy
- Ukrainian AD increasingly effective
 - redeployed for AD against CMs around key cities/infra
 - March-April: **interception rates 20–30%, mid-June 50–60%.**
 - SA-11 'Buk' SAM systems allocated to frontline defence
 - long-range S-300 SAMs for city & infra defence
 - more capable against CMs & Tochka-U BMs
 - coverage over a wider area/less mobile than SA-11

Missiles hit power stations in Lviv and along crucial railways in central and western Ukraine.

Altogether, six electrical substations were struck along the railways in central and western Ukraine, according to a top rail official. The rail system is the country's lifeline for humanitarian and military supplies.

Russia intensifies attacks on railways, taking aim at Ukraine's lifeline to the outside world



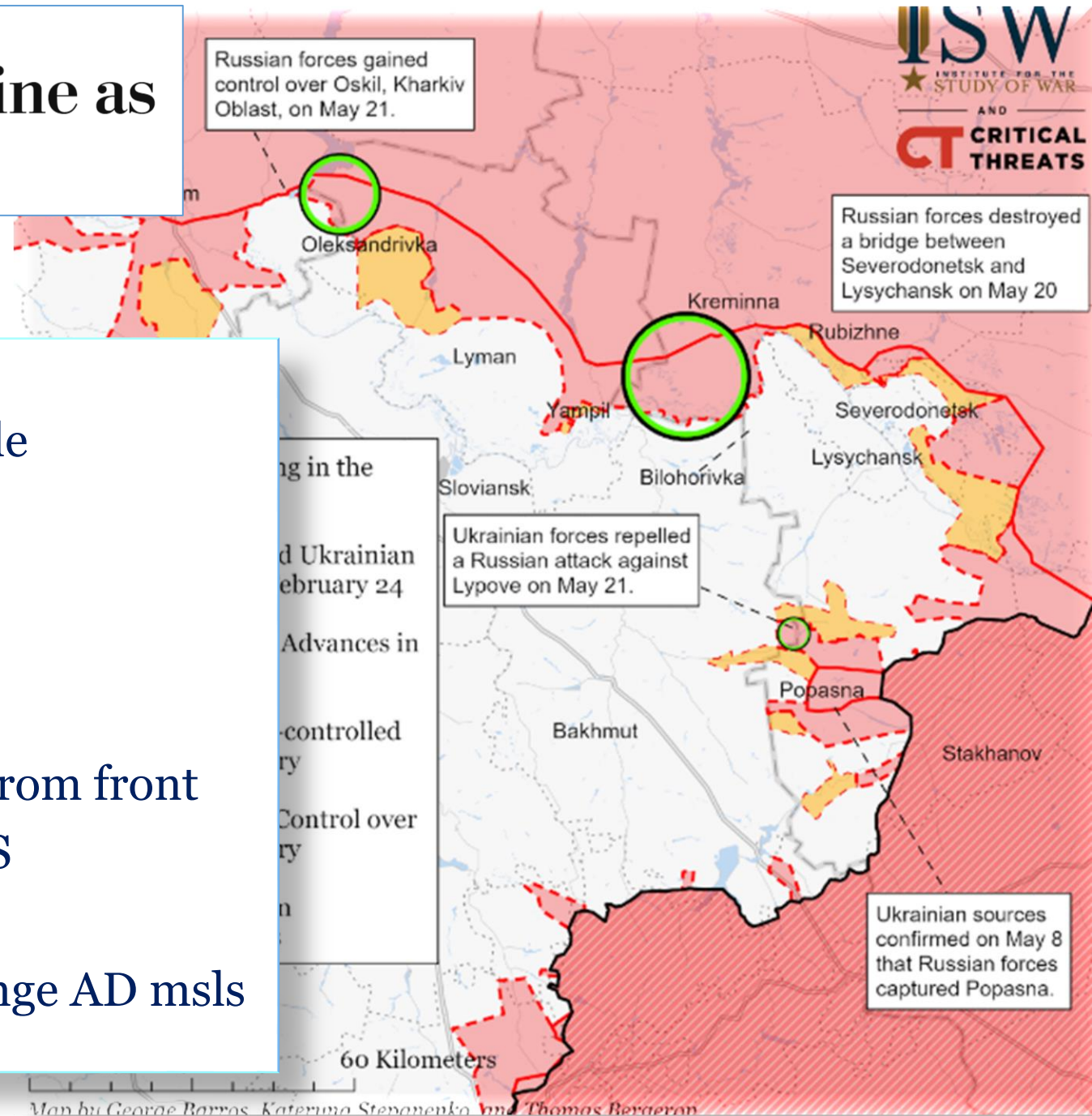
By Ivana Kottasová, Petro Zadorozhnyi and Lauren Said-Moorhouse, CNN
Updated 11:04 AM EDT, Tue May 10, 2022



Russia tries to rebound in Ukraine as prospects for victory fade

Fight for air superiority

- More use of RU fighters & EW in SEAD role
- Forcing Ukr AD to switch on
- Strikers come in low in DEAD role
- Art'y against SAMs
- Ukr SAMs forced further from front
- Increasing # of Ru CAS, AI, but < 100km from front
- Ukr manpads result in lo effectiveness CAS
- Long range bombers with CMs
- High level Ru stand-off CAPs with long range AD msls



NATIONAL SECURITY

U.S. dials up shipments of radar-hunting missiles for Ukraine

By Dan Lamothe

September 8, 2022 at 3:53 p.m. EDT

Ukrainian Su-27s Are Now Using AGM-88 HARM Missiles Too

September 9, 2022 War in Ukraine, Weapons



STEFANO D'URSO



An Ukrainian Su-27 loaded with two AGM-88 HARM missiles. (Photo via Telegram)

The Ukrainian Air Force posted a video that appears to show a Ukrainian MiG-29 fighter armed with an AGM-88 HARM missile.

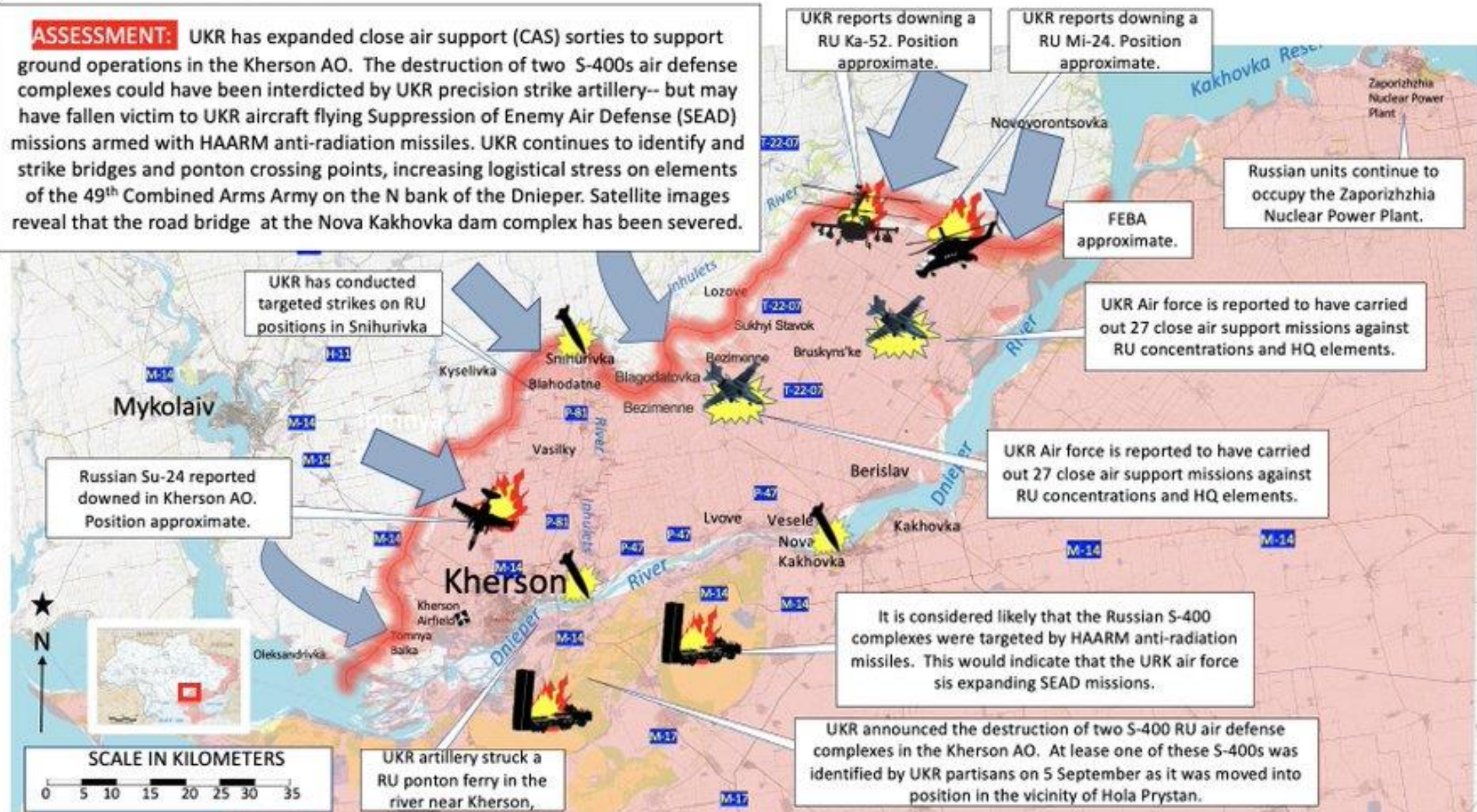
facebook.com/kpszsuvideos/...



KHERSON AXIS UKRAINE REPORTS THE DESTRUCTION OF TWO RUSSIAN S-400 AIR DEFENSE COMPLEXES, Mi-24 AND Ka-52s.

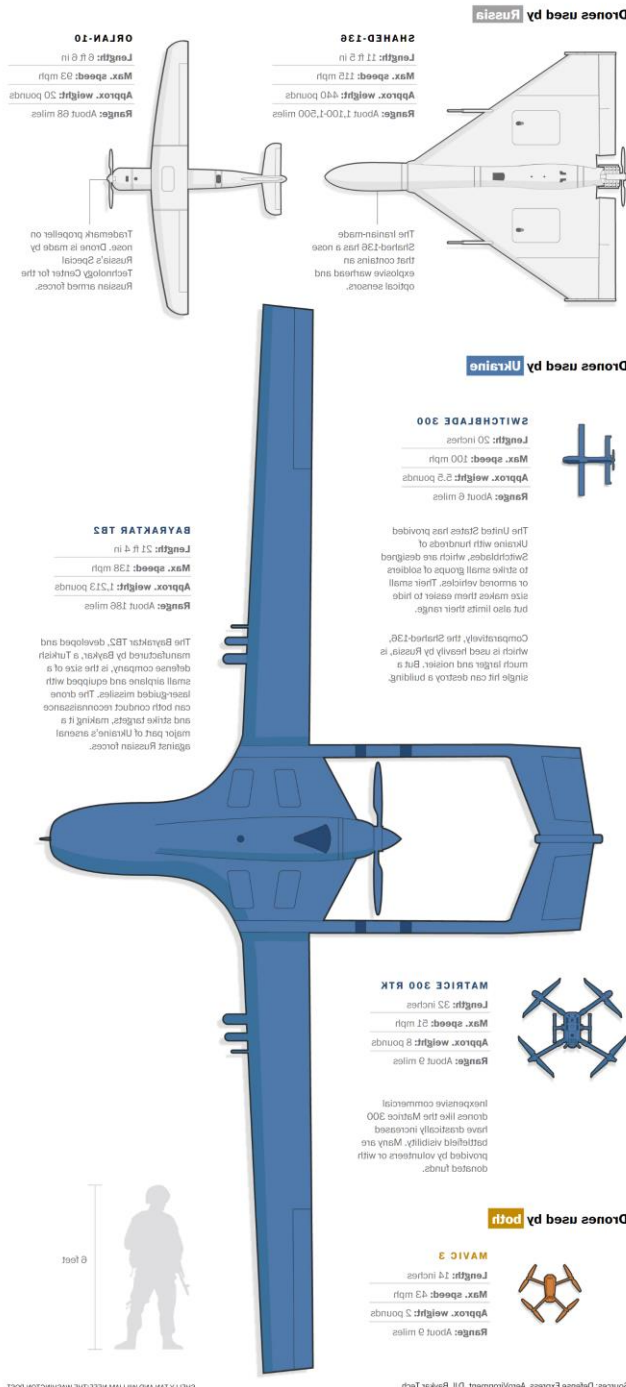
1245 UTC 8 SEPT S-400 AIR DEFENSE COMPLEXES, Mi-24 AND Ka-52s.

ASSESSMENT: UKR has expanded close air support (CAS) sorties to support ground operations in the Kherson AO. The destruction of two S-400s air defense complexes could have been interdicted by UKR precision strike artillery-- but may have fallen victim to UKR aircraft flying Suppression of Enemy Air Defense (SEAD) missions armed with HAARM anti-radiation missiles. UKR continues to identify and strike bridges and ponton crossing points, increasing logistical stress on elements of the 49th Combined Arms Army on the N bank of the Dnieper. Satellite images reveal that the road bridge at the Nova Kakhovka dam complex has been severed.



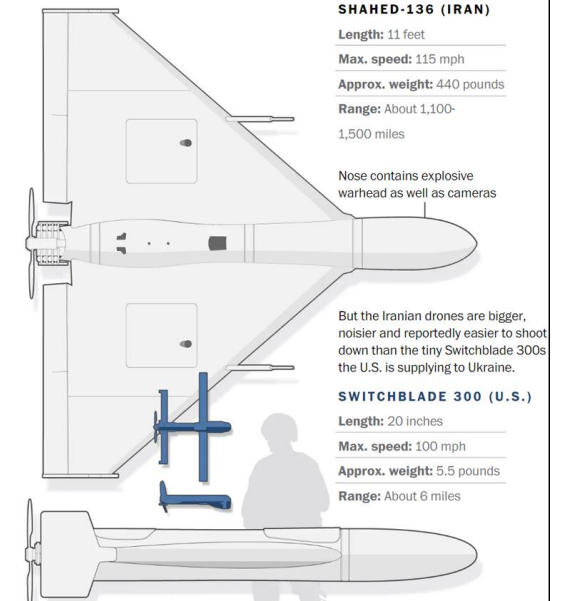


- Novel combinations with infantry & art'y ops
- Used in counter AD in EW mode combined with strike fighters
- High attrition number: 90%
- Average sortie # before KIA: 5-6
- Vulnerable for EW
- Radiolocation: Risks for operators



Drones over Ukraine: Death in different sizes

Iranian Shahed-136 drones can loiter over areas for hours until their cameras identify a target and the drone drops on it like a bomb. The Russians are using these weapons to devastating effect without risk to their troops.



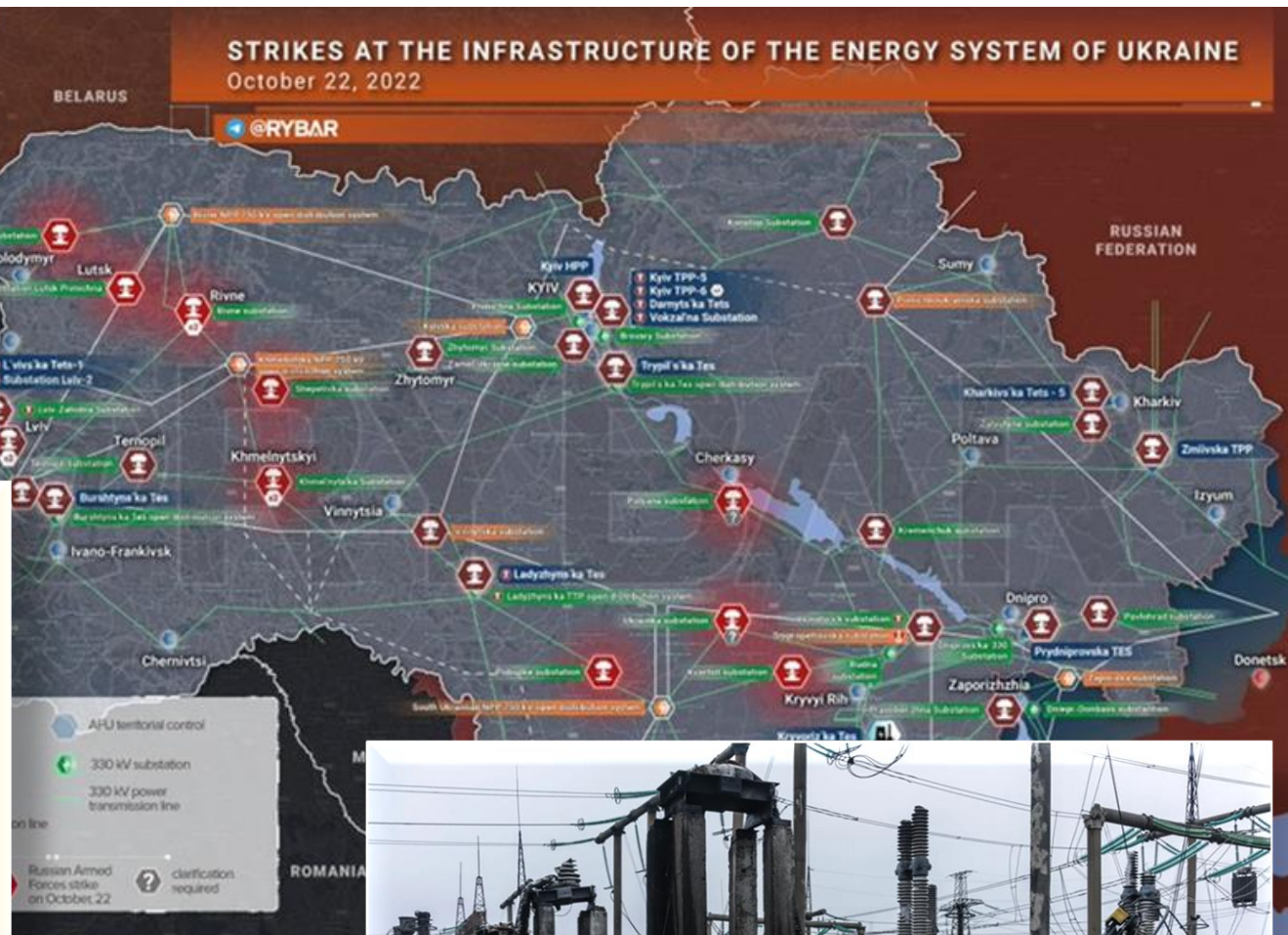
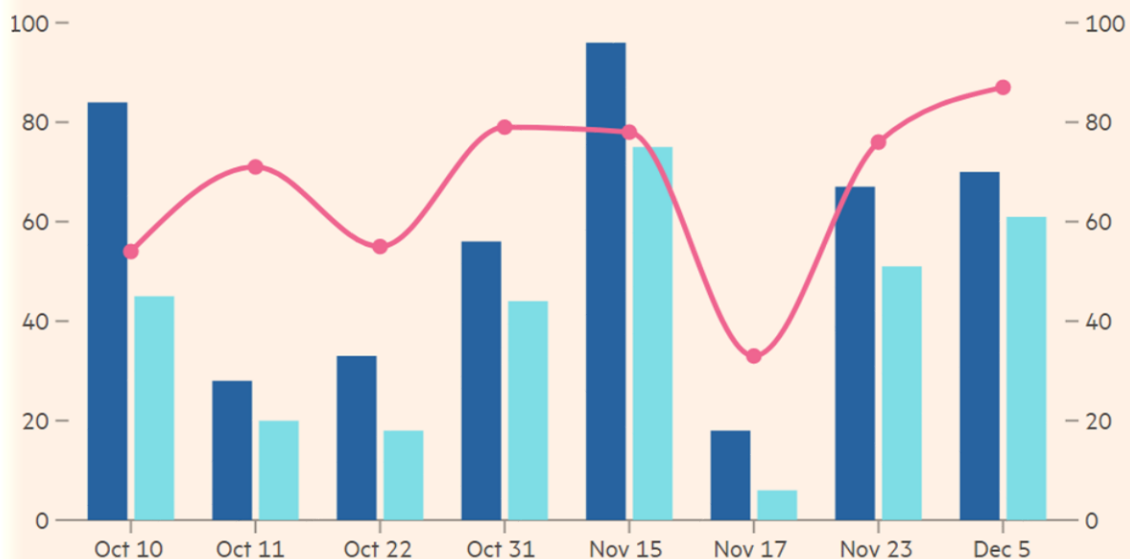
For Ukraine, Keeping the Lights On Is One of the Biggest Battles

This week's missile assault by Russian forces has hit at least 15 energy facilities — some for the fifth or sixth time — forcing controlled blackouts in every part of the country.

Ukraine's high interception rate

Recent Russian missile attacks

■ Number launched ■ Number intercepted ■ % intercepted



“We have no other choice but to switch to these types of weapons since the Soviet weapons of the [19]70s and [19]80s are both [. . .] obsolete and the enemy is exhausting them every day.”



Estonia calls on NATO for stronger defence of its Baltic members

STRONGER DEFENCE AND DETERRENCE

40,000 TROOPS UNDER DIRECT NATO COMMAND
130 ALLIED AIRCRAFT AT HIGH ALERT
100,000 US TROOPS DEPLOYED TO EUROPE
140 ALLIED SHIPS AT SEA

21. We will significantly strengthen our deterrence and defence posture to deny any potential adversary any possible opportunities for aggression.

To that end, we will ensure a substantial and persistent presence on land, at sea, and in the air, including through strengthened integrated air and missile defence.

We will deter and defend forward with robust in-place, multi-domain, combat-ready forces, enhanced command and control arrangements, prepositioned ammunition and equipment and improved capacity and infrastructure to rapidly reinforce any Ally, including at short or no notice.

We will adjust the balance between in-place forces and reinforcement to strengthen deterrence and the Alliance's ability to defend.

Commensurate with the threats we face, we will ensure our deterrence and defence posture remains credible, flexible, tailored and sustainable

CARRIER STRIKE GROUP

NORWAY

EXERCISE COLD RESPONSE
OVER 30,000 TROOPS FROM 27 COUNTRIES

AIR POWER
ALLIED TROOPS 4,000
HOST NATION 16,800

ESTONIA

LATVIA

LITHUANIA

AIR POWER
ALLIED TROOPS 2,000
HOST NATION 7,000

AIR POWER
ALLIED TROOPS 1,700
HOST NATION 7,400

POLAND

AIR DEFENCE
ALLIED TROOPS 10,500
HOST NATION 120,000

& SURVEILLANCE

SLOVAKIA

HUNGARY

AIR DEFENCE
ALLIED TROOPS 2,100
HOST NATION 13,000

ROMANIA

BULGARIA

ALLIED TROOPS 900
HOST NATION 26,000

ALLIED TROOPS 3,300
HOST NATION 76,000



NATO 2022
STRATEGIC
CONCEPT

CARRIER STRIKE GROUP

SOVIET FORCES and NATO in Central Europe



NATO Central and Northern Region. Airpower in Place
1,340 Fighter/Strike
445 Interceptor
200 Recce

Warsaw Pact total in Europe

173 Divs (inc 9 airborne/airmobile)
and 15 Divs in Central Soviet Union

On Central + Northern Region

104 Divs.
50* of which could launch operations
soon after mobilisation

Central and Northern Region. Airpower in Place

1,580 Fighter/Strike
2,595 Interceptor
415 Recce

in Central Europe

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Map Labels:

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- Dutch
- North German Plains
- British
- Belgian
- W. German
- United States
- Frankfurt
- Wurzburg
- EST GERMANY
- (French)
- Stuttgart
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- Poland
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- Magdeburg
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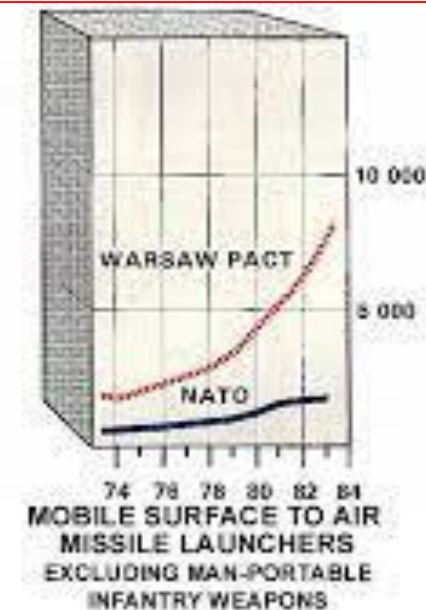


Table 1. NATO/WARSAW PACT CONVENTIONAL BATTLEFIELD FORCES IN EUROPE

Category	NATO ¹	Pact ²
Division Elements ³	90	133
Main Battle Tanks	19,600	32,000
Artillery, Mortar, & Multiple Rocket Launchers	14,200	23,000
Anti-tank Guns and Missile Launchers	13,370	18,000
Anti-aircraft Guns and Missile Launchers	6,900	12,800
Armored Personnel Carriers and Infantry Fighting Vehicles	32,850	38,000
<u>Aircraft</u>		
Armed Helicopters	1,430	1,410
Land Attack Aircraft ⁴	2,360	3,200
Fighter/Interceptors	900	2,700 ⁵

Source: Adapted from Andrew Hamilton, "Redressing the Conventional Balance," International Security 10 (Summer 1985), 114; U.S. Department of Defense, Soviet Military Power 1987 (Washington, D.C.: GPO, 1987), pp. 92-93.

The air denial challenge

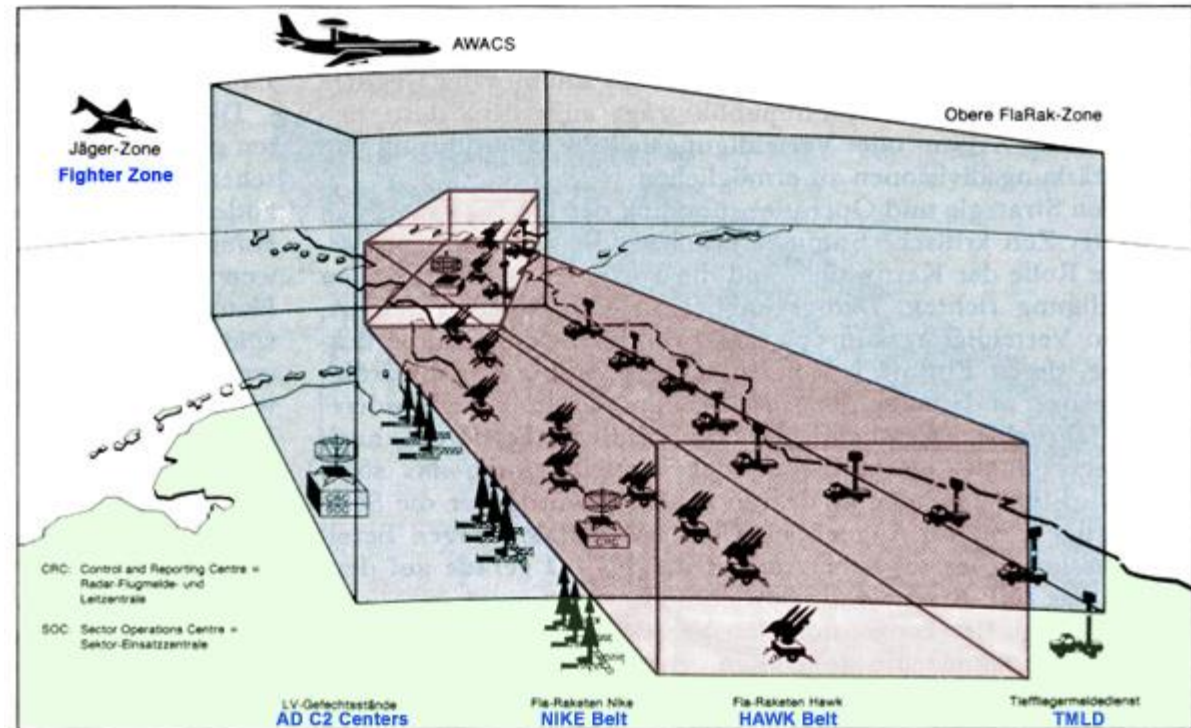
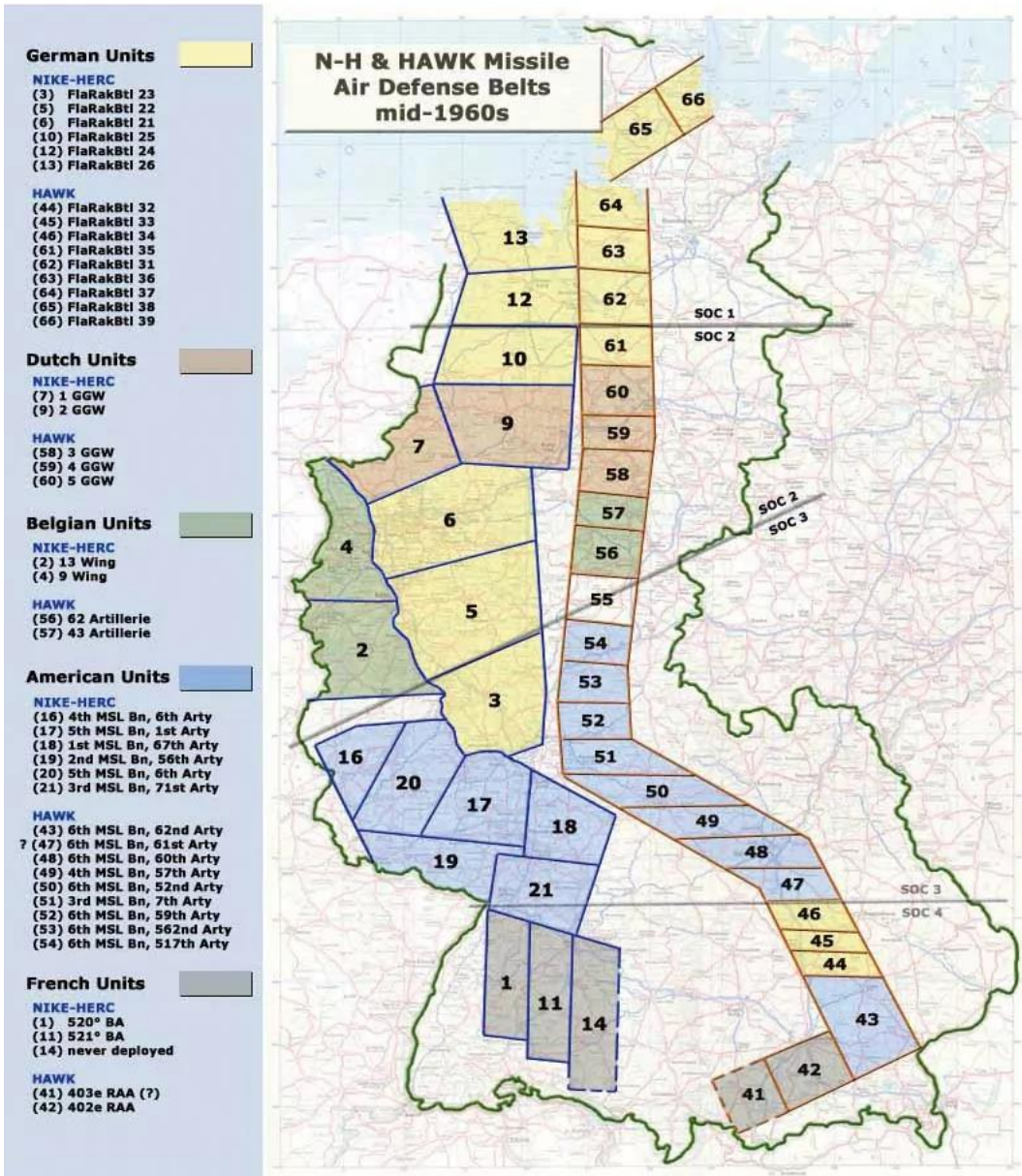


1967 MC 14/3 Flexible response

- New emphasis on conventional forces

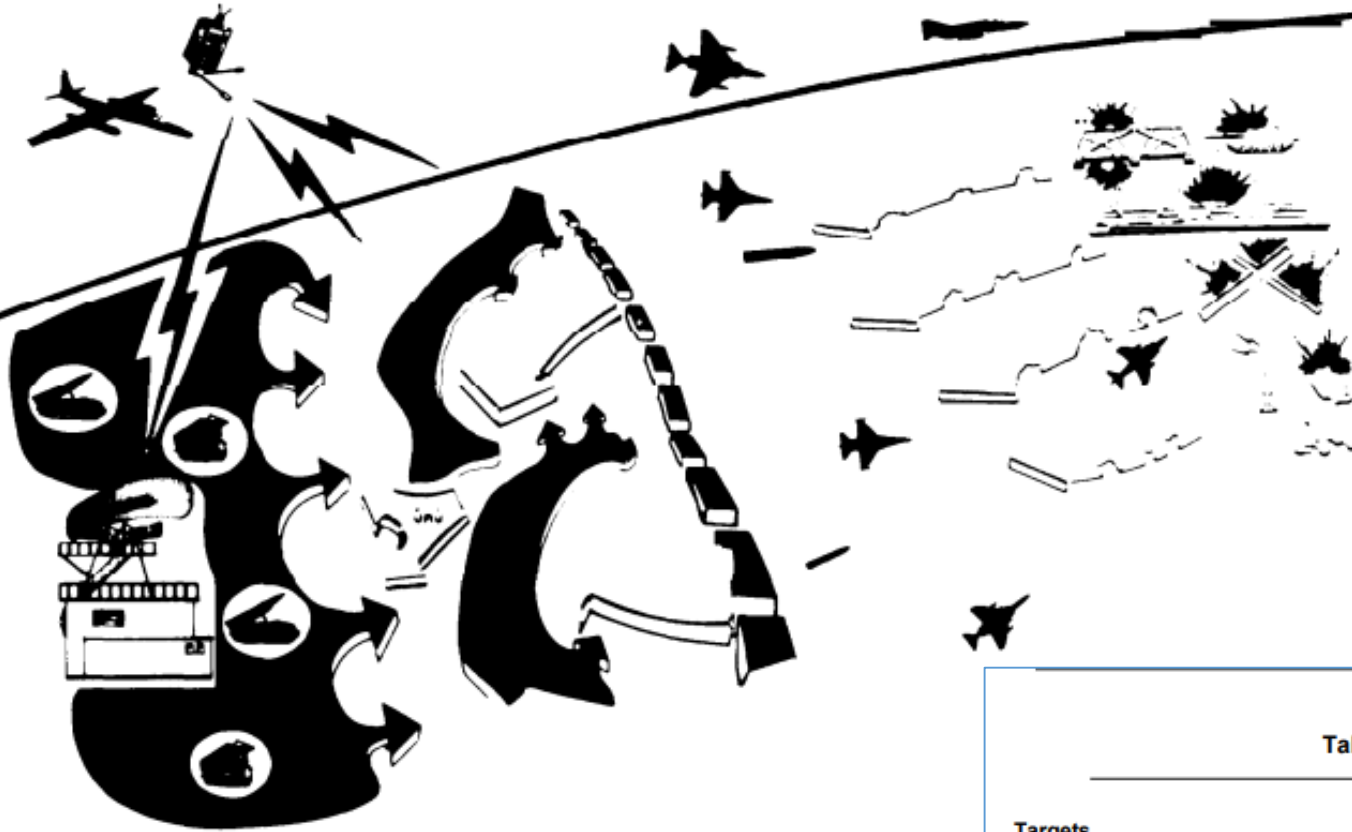
Air strategy tasks:

1. Secure initial deployments from air attacks
2. Protect ports
3. Preserve freedom of maneuver for ground forces:



Das Luftverteidigungssystem der NATO

Figure 2-3.— FOFA Reduces Advancing Forces



SOURCE SHAPE

FOFA concept

- Deep strikes Tornado, F-111
- COMAO packages: Recce, AI & OCA
- Embedded SEAD/DEAD/EW/SWEEP
- BAI, CAS
- MLRS
- JSTARS & AWACS
- Corps/Div Air Liasons

Table 6-1: Summary of Targets and Objectives for FOFA^a

Targets	Range (kilometers beyond FLOT)				
	5 to 30	30 to 80	80 to 150	150 to 350	350 to 800
Moving columns	1	1	2		
Units in assembly areas	1	1	2		
Command posts		2	2		
Chokepoints and halted units			2	2	
Units transported on roads				2	
Units in off-loading areas				2	
Units transported on rails					3
Rail network					3
Levels of damage ^b	1 "Destroy"	2 "Disrupt"	3 "Delay"		

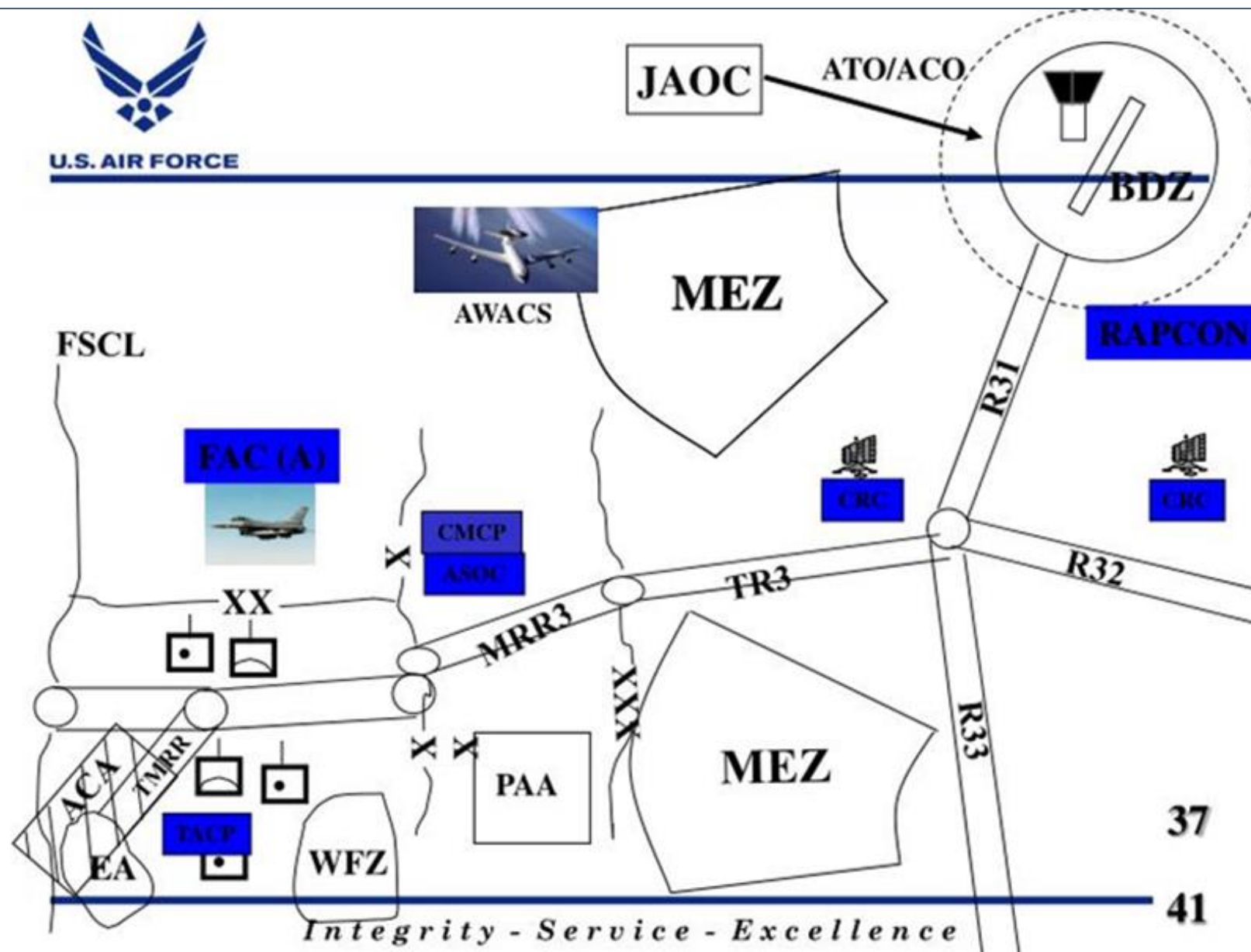
^aThis choice of objectives for FOFA operations is based on information received from SHAPE, US Army, and US Air Force sources, as discussed in ch 5. This choice of targets and objectives is for OTA analysis only, and is not intended to be exhaustive or definitive.

^bSee ch 5 for discussion of desired levels of damage.

SOURCE Office of Technology Assessment, 1987



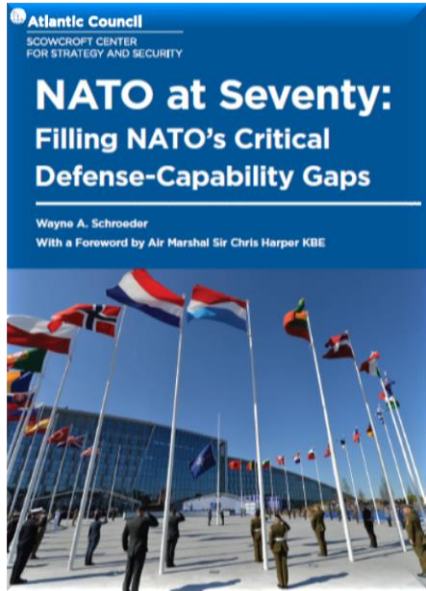
U.S. AIR FORCE



PROCEDURAL CONTROL

Relies on previously agreed to and distributed airspace control measures such as:

- Comprehensive air defense identification procedures and rules of engagement
- Low level transit routes
- Minimum risk routes
- Aircraft identification maneuvers
- Fire support coordinating measures
- Coordinating altitudes
- Restricted operations zone/ restrictive fire area
- Standard use Army aircraft flight route
- High-density airspace control zone



Air & MSL Def critical for deterrence credibility

- invest in conventional **deterrence by denial** capabilities to close the tactical-nuclear gap and to prevent the re-nuclearization of European security
- **address critical capability shortfalls in A2/AD**
 - stand-off munitions,
 - counter A2/AD: SEAD, DEAD,
 - Enhanced GBAD, TBMD, counter drone
 - EW
 - Modernized (& hardened) C4ISR.
 - 5th Generation combat aircraft
- **Exploit Western asymmetric edge to avoid attritional confrontation: sea & air power**

