

Threat avoidance and evasion in the Ka50

...

A practical guide



Outline

Common threats (7min)

Other threats (4min)

Some brevity (2min)

Defeating the threat: A practical guide (core of the talk)
(6min)

Video break (10min)

Questions (?)


Training flight brief (2min)

Introduction

Scope: 696th and DCS only

Not “realistic”

Threats classification

Focus of the talk

Conventions

Common threats:
Anti Air Artillery (AAA)

ZU-23-2 “Sergei”

[Info from Wikipedia](#)

Length: 4.57 m (15 ft)

Width: 2.88 m (9.44 ft)

Height: 1.22 m (4 ft)

Weight: 0.95 tonnes (2,094 lbs)

Armament: two 2A14 Afanasyev–Yakushev 23x152mm (.90 in)
autocannons

Barrel length: 2 m (6.5 ft)/ 87.3 calibers

Muzzle velocity: 970 m/s (3,182 ft/s)

Projectile weight: 186 g (6.27 oz)

Rate of fire



ZSU-23-4 "Zeus" ("Shilka")

[Info from Wikipedia](#)

Weight: 19 tonnes

Length: 6.535 m

Width: 3.125 m

Height: 2.576 m (3.572 m with elevated radar)

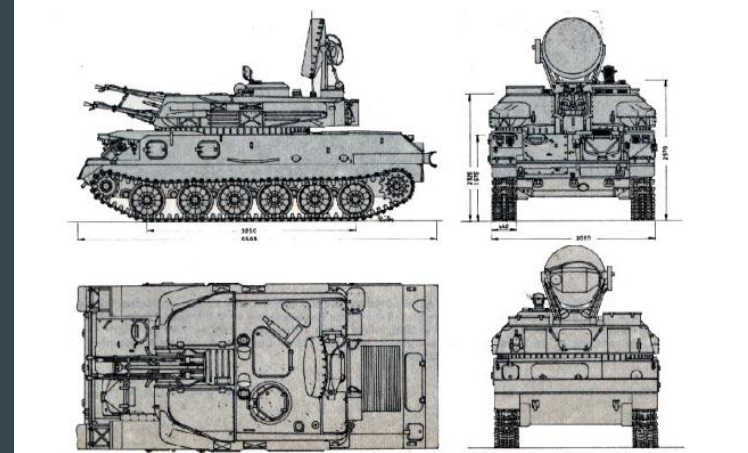
Armor: Welded steel, 9.2 mm turret, up to 15 mm hull

Main armament: 4 × 23 mm 2A7 autocannons (AZP-23 "Amur" quad automatic anti-aircraft gun), ammunition 2,000 rounds

Operational range: 450 km (road), 300 km (off-road)

Speed: 50 km/h (road), 30 km/h (off-road)

A typical loading of each ammunition belt contains 40 OFZT and 10 BZT rounds. They can be fired to a maximum horizontal range of 7





AAA: things to remember

Max effective range: 2.5km

Max effective altitude: 1.5km (above ground)

Very dangerous at close range, they excel at ambush

On the other hand, detected early enough, they do not pose much of a threat to the Ka50



Common threats:
Infrared (IR) guided
Surface to Air Missiles (SAMs)

SA9 “Gaskin” (“Strela-1”)

[Info from Wikipedia](#)

Weight 7,000 kg

Length 5.8 m

Width 2.4 m

Height 2.3 m (travelling)

Armour 5–14 mm

Main armament 4 x 9M31 (or 9M31M)

Operational range 750 km

Speed 100 km/h (road) 10 km/h (water)

9M31

Warhead Frag-HE 2.6 kg



SA13 “Gopher” (“Strela-10”)

[Info from Wikipedia](#)

Weight 12,300 kg

Length 6.6 m

Width 2.85 m

Height 2.3 m (travelling), 3.8 m (firing)

Armour 7 mm

Main armament 4 × 9M333 (or 9M37MD)

Operational range 500 km

Speed 61.5 km/h (road) 6 km/h (water)

9M333

Warhead Frag-HE 5 kg



SA18 “Grouse” (“Igla”)

[Info from Wikipedia](#)

Weight 10.8 kg (24 lb)

Length 1.574 m (5.16 ft)

Diameter 72 mm

Warhead 1.17 kg (2.6 lb) with 390 g (14 oz) explosive

Detonation mechanism contact and grazing fuzes

Operational range 5.2 km (3.2 mi)

Flight ceiling 3.5 km (11,000 ft)

Speed 570m/s (peak), about Mach 1.9

Guidance system dual waveband infra-red (S-version)





IR SAMs: things to remember

Max effective range: ~5km

Max effective altitude: higher than you

Missile can be fooled

Limited ammunition

A special case:
The neighborly SA19

SA19 “Grison” (“Tungunskaja”)

[Info from Wikipedia](#)

Weight about 35,000 kg (77,000 lb)

Length about 7.90 m (25 ft 11 in)

Width about 3.25 m (10 ft 8 in)

Height about 4 m (13 ft 1 in) or about 3.35 m (10 ft)
(radar stowed)

Armour protects the vehicle from 7.62 mm small arms fire and shell splinters

Main armament 8 × 9M311, 9M311K, 9M311-1, 9M311M, 9M311-M1 or 57E6 missiles

Secondary armament 2 × 30 mm 2A38M guns (1,904 rounds carried)

Operational range 500 km (310 mi)



SA19 “Grison” (“Tungunská”)

[Info from Wikipedia](#)

9M311

Warhead Continuous-rod and steel cubes 9 kg

Detonation mechanism Laser fuze (Radio fuze for 9M311-M1)

Operational range 8 kilometres (5.0 mi)

Flight ceiling 3,500 metres (11,500 ft)

Boost time 2 stages:

boost to 900 m/s

sustained 600 m/s stage to range

Speed 900 m/s maximum

Guidance system Radio Command guidance



Other threats

Small caliber firearms

Practically every ENI ground unit

Treat as AAA

ATGMs

Modern MBTs and M-ATVs

Surprisingly long-range

Be safe, be moving

LWS

Airborne threats

Enemy fighters

Enemy attack planes

Enemy attack helicopters

Long range SAMs

SA15 “Thor”

Static SAM systems (SA2 “Guideline”, SA3 “Goa”, SA6 “Gainful”,
SA10 “Grumble”, SA11 “Gadfly”, ...)

Avoidance

Defeat

Wild Weasel role (SEAD/DEAD)

Some brevity

Brevity – APP-7 (E)

BREAK (Direction) – Perform “An immediate maximum performance turn in the direction indicated”.

BIRD – Friendly surface to air missile.

DEFENDING (w/direction) – Aircraft is in a defensive position and maneuvering with reference to a surface-to-air threat.

DEFENSIVE – Aircraft is under attack, manoeuvring defensively, and unable to ensure deconfliction or mutual support.

FLARES – Deploy flares.

Brevity – APP-7 (E)

JINK – Perform an unpredictable manoeuvre to negate a gun tracking solution.

JINKING – Unpredictable manoeuvres, i.e. to negate a weapons tracking solution.

KICK (Degrees RH/LH or heading) – a defensive check turn in a specified direction.

SAM (direction) – Visual acquisition of a SAM or SAM launch (BLUE 3, SAM, right 4 o'clock).

Defeating the threat: A practical guide



Evading ground to air fire – the common workflow

Make the call

“Jink” or “notch” (we’ll talk about that in a bit)

Escape direction

Mutual cover

Once safe:

Status update

Rebuild SA



Evading AAA

“Jink” is a fancy word for “Make unpredictable manoeuvres”.

Only when the threat is actually firing ! (energy & SA)

Learn the rhythm

Up, down, left, right

[Live demo](#)



Evading IR SAMs

Place the threat on your 3/9 line (BREAK left/right)

Gain speed

(if possible) Dive

(if possible) Collective down to reduce IR signature

Maintain visual on:

The incoming missile

The launcher

Pump flares until:

Evading (any) SAMs – other methods

Those are methods that work whatever the type of SAM

Duck – go low (<10m from the ground)

Cover – use terrain or terrain features to hide behind

Video break



Question ?

Link to this presentation:
<https://goo.gl/ckoyuv>

<https://goo.gl/ckoyuv>
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Before we jump in

A quick pre-flight “briefing”

Informal, casual

Empty map

All AIs on highest difficulty setting

Naming conventions: AI_ZSU23-4_KA #001, H_SA19_KA #004

“H” threats must be coordinated with a human troller

Please don't engage the threats

Call spent threats