

Digital Combat Simulator / DLC Campaigns / L-39 Kursant / Briefings

1. PRACTICING CIRCLE PATTERN AT LOW ALTITUDE

Practice visual landing approach (without use of RSBN-5S and RKL-41) at an altitude of 200m.

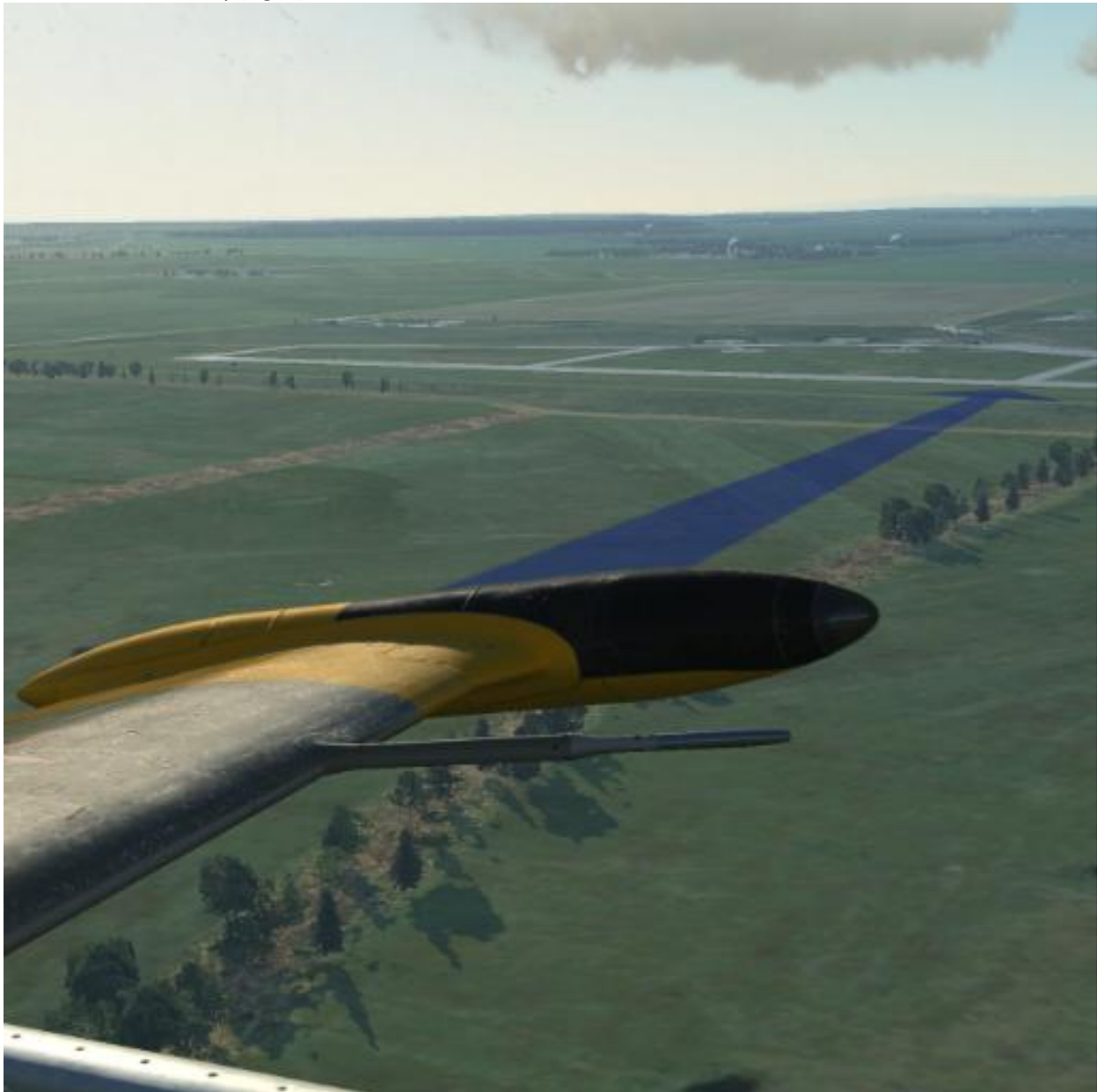
Perform a circle pattern flight at an altitude of 200m.



After takeoff, at an altitude of 15m and speed of not less than 200 km/h, retract the landing gear. At an altitude of 50-70m and speed of not less than 250 km/h, retract the flaps. When speed of 350 km/h has been reached, set the RPM to 100% and continue climbing with an acceleration to 350 km/h to 200m.

The first and second turns must be performed together at altitude of 200m, a speed of 350 km/h, and a roll of 45°. When exiting the second turn, you should be on the downwind leg. Maintain a speed of 350 km/h and an altitude of 200m.

Once abeam of the runway threshold, set the engine RPM to 80%, reduce airspeed to 330 km/h, and extend the landing gear. Set RPM of 90% and maintain an airspeed of 300 km/h. When abeam of runway's center-point, visually control the radius (width) of circle pattern, based on wingtip position relative to the runway (fig. 4).





When the runway threshold is approximately at your 8 o'clock (fig. 5), perform the third turn to the left with a roll of 45° and a speed of 300 km/h on a landing course $+60^\circ$ (the course pointer on the RMI will point to value of 30 on the external scale). Set engine RPM to 85% for an airspeed of 280 km/h and extend flaps. After the flaps have been extended, maintain an airspeed of 280 km/h at altitude of 200m.

When the angle to the runway is $10-15^\circ$, perform the fourth turn with a roll of 30° at speed of 280 km/h to align the aircraft with a continuation of the runway's centerline. While performing the fourth turn, do not allow your airspeed to fall below 250 km/h.

In the second phase of the fourth turn, set your descent angle by aiming toward the runway threshold. Set flaps to 44° and begin descending along the glide path. While on glidepath, do not allow your airspeed to fall below 230 km/h. Prepare for landing.

While performing this lesson, the following minor deviations outside the briefed parameters are allowed: speed - 30 km/h, altitude - 30m, yaw and roll - 10° . Try to not exceed these restrictions.

Based on your performance, the instructor pilot will decide if you passed the lesson.

Weather: Clear weather conditions
ATC controller: channel 4

2. LOW LEVEL ROUTE FOLLOWING

Low level flight without use of radio navigation aids.

During this lesson, you will practice:

- Reaching of starting point (SP) of the route
- Flying a given route
- Reaching waypoints (WPT), visual identification points (VIP), target (TGT), and the end route point (EP)
- Arriving at target location at a given time
- Monitoring and adjusting location of the aircraft while enroute
- Visual navigation

Takeoff exactly at 08:15:00. After takeoff, climb to an altitude of 200 m, accelerate to TAS = 410 km/h (thin pointer), and reach starting point (SP) of the route (river along a forest, behind the outer NDB).

Once over the SP, press the right button of the clock to enable the stopwatch, and perform a right turn with a roll of 45° to a course of 265° (village of Goryachiy Klyuch).

The route is segmented into one-minute intervals. This allows you to control aircraft position, but only if the required speed is maintained. Flight time is controlled with help of second's needle on the STOPWATCH.

Once over the WPT, toggle the stopwatch (triple click on the right button of the AChS-1M) and perform right turn with a roll of 45° to a course of 31°. This will bring you to the visual identification point (VIP is located at abeam of village of Prirechenskiy). Estimated Time Of Arrival (ETA) at VIP is 08:29:34.

Once over the VIP, check the actual time of arrival (ATA). If ATA deviation is more than 30 seconds, compensate for this deviation by altering airspeed in order to reach the TARGET (city of Ust'-Labinsk) at the required time.

Estimated Time On Target (ETA TGT) is 08:38:07.

How to reach the TARGET at a given ETA.

Using the minute needle of the AChS determine to determine ATA VIP. Using the table in the amendments, calculate the required airspeed for a given ETA VIP. After that is set, maintain this speed until the target is reached. This method is called "maneuver by speed".

Example:

ETA VIP = 08:29:34

ATA VIP = 08:29:04

The minute needle is on the tick mark corresponding to 29 minutes. The VIP is reached 30 seconds later. Using the table of amendments, the ATA for VIP corresponds to an airspeed of 386 km/h.

When the minute needle is between the two ticks, 30 seconds should be added to value of tick on the left side.

Example:

ATA VIP = 08:29:34

Minute needle is between 28th and 29th ticks.

The difference between ATA TGT and ETA TGT is the delta time error and should not exceed 100 seconds.

Once over the TARGET, restart the stopwatch and perform right turn with a roll of 45° degree to a course of 157°. This will bring you to the EP (village of Hanskaya). If maneuver by speed was performed prior reaching the target, then the over TARGET is set to an airspeed of 410 km/h.

Over the EP, set your airspeed to 350 km/h and turn to the left with a 45° roll to downwind leg. Identify the runway and perform a landing.

On each leg of the route are reference points (RP) to the right and to the left of flight path. These are useful to maintain position along the route. These reference points can be found in the flight plan.

How to determine aircraft position and adjust course.

When reach reference points along the route, the instructor will give a command PREPARE TO CONTROL FLIGHT PATH.

After this command you must:

Compare flight plan in the briefing or kneeboard to the terrain around you and wait for the corresponding RP.

When abeam of RP, the instructor(trainer) will give the command: CONTROL FLIGHT PATH.

After this command, visually determine the position of the aircraft relative to the RP along flight plan. Use flight path deviation tick marks to determine the position of aircraft more accurately, and adjust your course accordingly.

In case of a large course deviation, the instructor will help identify the position of the aircraft.

Conditions: Clear weather conditions

Flight altitude: 200 m

Landing course: 219°

ATC Maykop: channel 4

3. LOW-LEVEL BOMBING FROM 100 METERS

Low-level bombing with assistance of RSBN-5S navigated reference point.

In this flight we will practice:

- Ingress to the weapon range while bypassing enemy air defenses
- Set armament control
- Maneuvering prior to bombing
- Bombing
- Egress the weapon range

To arrive at the weapon range, perform an enroute flight: starting point (SP) Rodnikovyy (A=276° D=3 km) - waypoint (WP) Imeretinskaya (A=266° D=48 km), reference point (RP) Suzdal'skaya (A=276° D=53 км).

The leg from RP to the TARGET is an ingress course of 276° . After passing the RP, descend toward the weapon range along the ingress course. Visually identify the target and perform a bombing attack.

The target is a rectangular area, located at an azimuth of 276° and a distance of 72 km, marked with red marker smoke.

When the bombing task is complete, egress along the route of: TARGET - Imeretinskaya - end point (EP) RSBN beacon.

Legs SP - WP, RP - TARGET (combat course) and WP - EP have azimuths of 266, 276 and 266° accordingly. Along the legs, navigate along the azimuths with the help of the RSBN-5S. To perform navigation, fly the azimuth to the RSBN beacon, set the course pointer using the course selector (CS) to the value of desired azimuth, and if flying away from the beacon, set a value of the azimuth minus 180°. To follow the required heading, fly to place the heading deviation pointer on RMI inside the circle.

EXECUTION

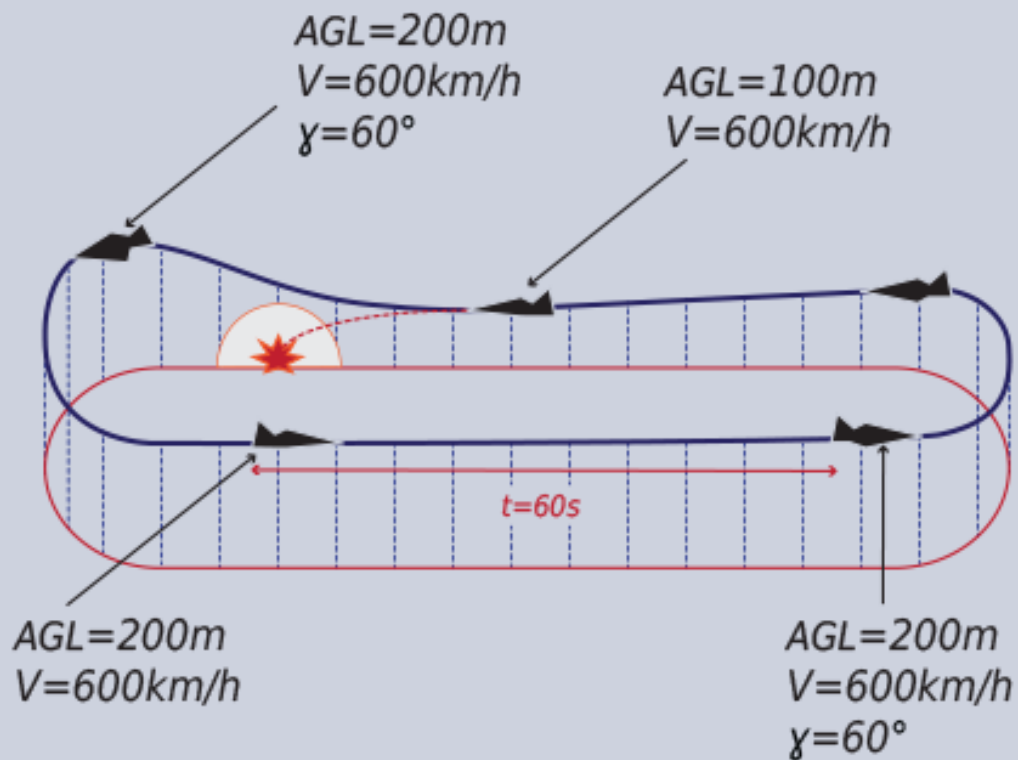
After takeoff, climb to an altitude of 200 m and accelerate to 350 km/h. At a distance of 5 km, turn to the left at a course opposite to a landing course with a roll of 45° to reach the SP, village of Rodnikovyy, which is located abeam of the runway 40 threshold. Once on this course, accelerate to 500 km/h. Once over the SP, turn to the right to a course of 266° with 45° roll, and climb to 900 meters. Fly toward WP Imeretinskaya. After the SP, use the course knob to set the course pointer to 266°.

Prior to reaching the WP, prepare your armament:

- On the main CB panel, enable the ARMS (ОРУЖИЕ) CB
- On the center panel, enable: LAUNCH (ПУСК), ASP (АСП) and BOMBS (БОМБЫ)
- On the armament panel by the left WEAPON CARRIER (ВЫБОР ДЕРЖАТЕЛЕЙ) button, select the outboard pylons
- Set the BOMBS TRAIN.-1-SALVO switch into SALVO (ЗАЛП) position
- On the gunsight, set the reflector angle to 11° and raise the seat all the way up.

Reaching the WP can be determined by the distance on the PPD-2 and the time flown on this leg. When over the WP, turn to the right on a course 335° with 45° roll towards RP Suzdal'skaya. When the turn is completed, set the course pointer to 276°. The instructor must then take over control over radio and establish communication with the weapon range ATC. Reaching the RP can be done by monitoring the movement of the heading bar towards the circle on RMI and the distance on the PPD to a required RP, as well as by the flight time of the leg.

LOW-LEVEL BOMBING FROM 100 METERS



Once over the RP, turn toward the attack ingress course (to the left, the course pointer has been already been set). After the turn, descend to a altitude Above Ground Level (AGL) 100 meters and accelerate to 600 km/h. While descending, control your altitude, over 750 meters use the barometric altimeter (VD-20), and below use the radar altimeter (RV-5M). While flying at an altitude of 100 meters, it is a good time to visually locate the target to the left and right of the flight path. When the target has been identified, adjust your course and flip the weapon arming trigger down. When the target is under the aiming reticle (fig. 3), press the weapon release trigger.



After two bombs have been released, perform a follow-up attack run. To do so, begin climbing with 10° pitch at a speed of 600 km/h. At an altitude of 200 meters (as indicated on the VD-20), turn to a course opposite to the attack heading. When the target is at abeam, start the stopwatch. Disable the left WEAPON CARRIER button for the outboard pylons, and using the right WEAPON CARRIER button, select the inboard pylons. After 1 minute on this course, turn to the left and back to the attack heading using a 60° roll.

When on the attack heading, descend to 100 meters (RV-5M), identify the target, and deliver your bombs.

After all bombs have been released, climb with a 10° pitch and reduce speed to 500 km/h. When the speed has been reached, turn to the left with 45° roll and fly a heading of 110° while climbing to 900 meters. The instructor will return control of the radio to the front cockpit.

After the turn, disable the armament controls, flip the weapon arming trigger up, and set the course pointer to a value of 86°. Navigating to the WP can be controlled by the movement of the heading bar towards the circle on ADI, the distance on the PPD to a required one, and the time flown on leg. Once over WP, turn to the left on a course of 86° (value indicated by the course pointer) and fly an

airspeed of 400 km/h.

At approximately 20 km to RSBN beacon, descend to 200 meters, as indicated on the VD-20.

After descent, identify runway and set the course pointer to a landing course of 39°. When the beacon has been reached, turn to the left, towards the landing course. Simultaneously, decelerate to 350 km/h for a resulting circle pattern approach and landing.

Conditions: Adverse weather conditions

Flight altitudes: 100 - 900 m

Landing course: 39°

RSBN: 34-Navigation and 36-Landing

Traffic controllers:

- ATC Maykop: channel 4

- ATC weapon range: channel 6

4. ROCKETS DEPLOYMENT AFTER COMBAT TURN

Rocket delivery with attack maneuvers (after combat turn).

In this lesson you will learn:

- Ingress to the weapon range
- Set up armament control
- Rocket delivery profile of attack dive after a combat turn
- Aiming and firing rockets
- Egress the weapons range

Conditions for firing rockets with dive angle of 20°:

- Depression angle set to 2°00' on the gunsight
- AGL while flying over target is 600 m
- AGL for beginning the combat turn is 300 m
- AGL to start the attack dive is 1100 - 1200 m
- Airspeed for dive entry is 350 - 400 km/h
- Slant distance for opening fire is 1460 m
- AGL for opening fire is 500 m
- AGL to start the dive exit is 440m
- Gs during dive exit is 3.5 - 4 G
- AGL minimum of level flight after dive exit is no less than 250 m

The target is a group of four MiG-15s in a 30 meter diameter circle. The center of targets is at azimuth of 276° and distance of 72 km. The attack ingress course will be 276°. The target area is marked with red smoke.

The elevation of Maykop airfield is 180 m above sea level (MSL) and the target area elevation is 50 m. This means that targets are 130 meters lower than airfield, and that should be taken into account. This difference should be entered into the barometric altimeter (VD-20) to ease maintaining required altitudes at the control points when manoeuvring.

Using the amendments, the altitudes on VD-20 are equal to:

- Altitude while flying over the target is 470 m
- Altitude when beginning the combat turn is 170 m
- Altitude to start dive is 970 - 1070 m
- Altitude to open fire is 370 m
- Altitude to exit the dive is 310 m
- Altitude minimum for level flight after dive exit is no less than 120 m

After the task is performed, turn towards the RSBN beacon and perform your initial approach and landing.

EXECUTION

After takeoff climb to 200 meters, simultaneously accelerating to IAS of 500 km/h, reach SP (river along forest edge, behind outer NDB).

Over SP turn to the right at a course of 282° to flight towards WPT (northern part of Bakinskaya village A=276° D=60km) climbing to altitude of 600 m.

Passing the SP, use the course knob to set a course of 276°.

Before reaching the WPT, set up the armament panel:

- On the armament control panel, enable ACBS: ARMS (ОРУЖИЕ), UB-16 (УБ-16), ASP-FKP (АСП-ФКП)
- Switch the 2RS-AUT-4RS set to the 4RS (4PC) position

On the gunsight:

- Set the deflection of the reflector to 2.00° and adjust seat height such that the central dot of gunsight reticle is seen in the center of the reflector
- Set a fictitious target base of 17 m
- Set the GYRO-FIXED switch to the GYRO (ГИРО) position
- Enter the minimum distance to the gunsight

To reach the WPT, control heading deviation of the pointer relative to the circle and keep the distance value close to the given one and time-of-flight.

USING THE RSBN-5S

For flight within range of RSBN stations, maps [RSHIFT+K] with azimuth and distance grids should be used. Azimuths are radial lines with 10° steps and the RSBN beacon is in the center. Distance circles are drawn at 10 km increments. The current azimuth of the aircraft (A) is read on the NPP's inner scale against the pointer with circle. Distance (D) is read on the PPD-2 gauge. Based on values of A and D, the map with azimuth and distance grids can be used to find the position of the aircraft. This position can be used to assist with visual navigation and for needed course adjustments to stay on the directed flight path.

The arrow end of the pointer with circle on the NPP points towards the landing airfield. This pointer, as well as pointer on the RKL-41, shows heading to the airfield. On the external scale of the NPP, against the same pointer, the RSBN beacon bearing is read.

HOW TO FIX DEVIATION AND CORRECT TO THE REQUIRED FLIGHT PATH WHILE FLYING TOWARDS THE WAYPOINT

To check if the aircraft is following the correct flight path, five control points (A/D) are given: 264/20, 269/30, 273/40, 274/50 and 276/60.

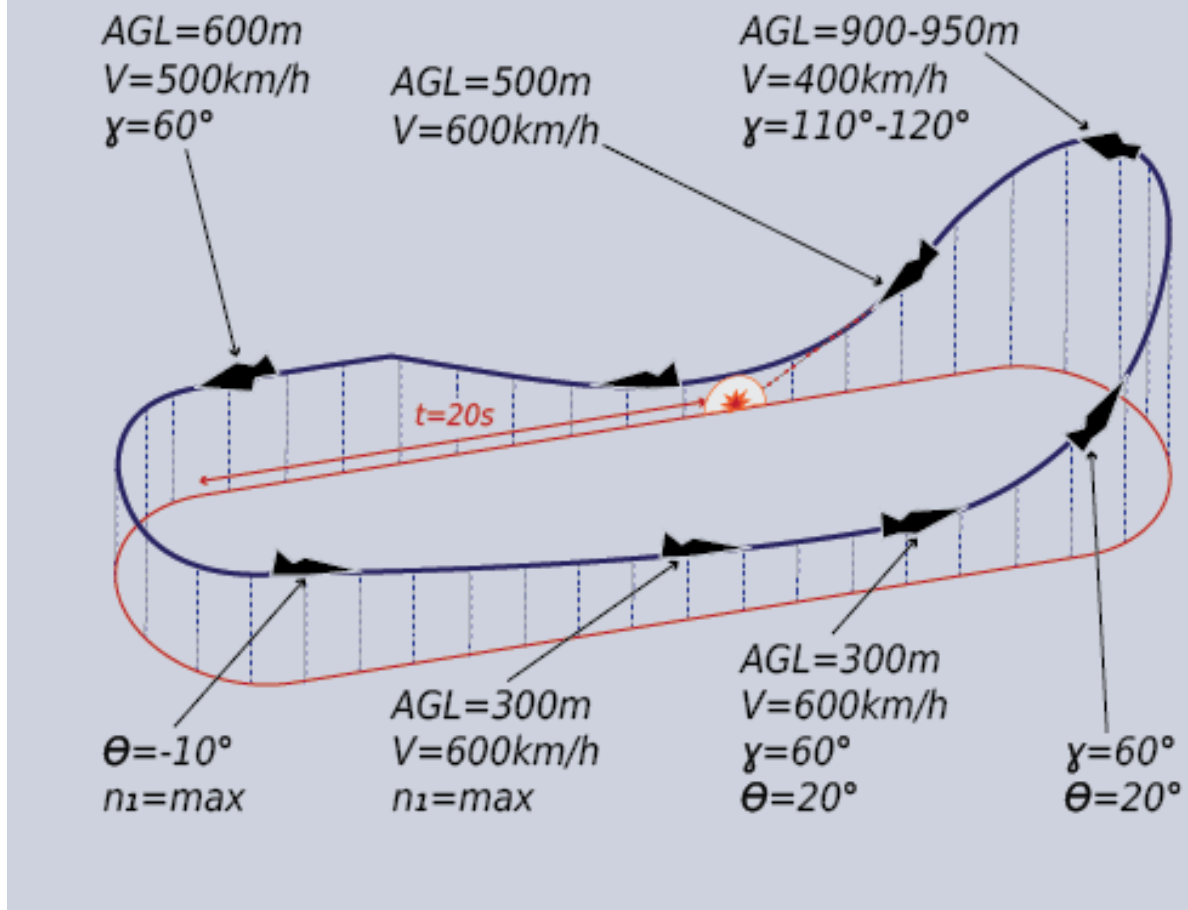
While flying towards the waypoint, maintain course of 282° . When the distance of the control point is reached, compare actual and given value of azimuth. If the error exceeds 2° , adjust aircraft heading. The value of adjustment is equal to the error value. If flying from the RSBN beacon, and actual azimuth is higher than given, then the aircraft is to the right of the required flight path (turn slightly to the left of the error value). If the actual azimuth is less than a given one, then the aircraft is to the left of the required flight path (turn slightly to the right on the error value).

For example:

At a distance of 20 km and an actual azimuth is 270° (while $A_{req}=264^\circ$) -error is equal to 6° , the aircraft is to the right of the required flight path.

Make course adjustment by turning to the left to a course of 276° ($282^\circ-6^\circ$) and fly with this course to the next control point 269/30. Once a distance of 30 km is reached, compare actual azimuth value with the given one. If the error is less than 2° - deviation was reduced to an acceptable level. Turn to the right to a course of 282° and continue flying toward the WPT. If the control point deviation error is still present, keep a course of 276° (adjusted course) until next control point is reached and repeat the check by the method described above.

ROCKETS DEPLOYMENT AFTER COMBAT TURN



Once over the WPT, turn to the left to the attack ingress course (course pointer set by course knob) and fly to an altitude of 470 meters (AGL=600m). After the target has been identified, fly over the target and start the stopwatch. After 20 seconds, turn at an opposite course with a 60° roll.

Once aligned on the attack course, dive 10° , increase RPM to maximum until you reach 170 meters (AGL=300m), and accelerate to 600 km/h.

If the maneuver is performed correctly, the target should move towards the tip of the fuel tank. As soon as target area has reached the middle portion of the fuel tank (fig. 1), perform a combat turn towards the target area with a pitch of 20° and roll of 60° . Once a pitch of $10-15^\circ$ is reached, start the roll with the rate of $15^\circ/\text{second}$. Once a roll of 60° and pitch of 20° achieved, maintain these parameters and continue the combat turn.

At an altitude of 770-820 meters (AGL=900-950m) and a target angle of view 90° , increase roll gradually to $100-120^\circ$ with a rate of $10^\circ/\text{s}$ and begin exit from the combat turn in a dive toward the target area. By changing the roll between $30-120^\circ$, find the correct trajectory such that at $110-120^\circ$, your altitude is 970-1070 meters (AGL=1100-1200m) and the aircraft is no longer climbing. IAS at the highest point of

the turn should be no less than 350 km/h.

At approximately 60° prior to the attack ingress course, fly the aircraft to enter a dive such that the attack ingress course is diving with angle of $20 \pm 5^\circ$. The turn and dive entry should be completed such that the center of reticle is under the target area. Sideslip of the aircraft should be compensated with a roll to the opposite side, set RPM of 95%.

Toggle the combat trigger on, fly to place the centermark of reticle over the target, and enter the maximum distance to the gunsight. Keep a steady dive and the centermark of reticle over the target. At an altitude of 370 meters (AGL=500m, and the reticle is over the target area, press the trigger once for a duration of 1 second.

After firing, exit from the dive with a simultaneous increase of RPM to maximum. Begin climbing with pitch of 10-15° and start the stopwatch. Reach an altitude of 470 meters (AGL=600m), set speed to 500 km/h, and after 20 seconds, reverse course.

When there are no more rockets or all four targets are destroyed, begin climbing with simultaneous turn towards the RSBN beacon. Flip the combat trigger up to disarm the weapons and set course to 219° for landing.

After airfield is identified, perform an approach and landing.

Conditions: Clear weather conditions

Flight altitudes: 200 - 1200 m

Landing course: 219°

RSBN: 34-Navigation and 36-Landing

Air Traffic Controllers:

- ATC Maykop: channel 4

- ATC weapon range: channel 6

5. ROCKET DELIVERY AFTER LOFT MANEUVER

Rockets delivery after advanced loft maneuver.

In this lesson, you will learn:

- Ingress to the weapons range
- Set up armament control
- Maneuver the aircraft for rocket delivery from a dive after a loft maneuver
- Aiming and firing rockets
- Egress the weapons range

Conditions for rocket delivery with a dive angle of 20°:

- Depression angle on gunsight is 2°00'
- AGL over target is 600 m
- Altitude at the beginning of the combat turn is 300 m
- AGL for start of dive is 1100 - 1200 m
- Airspeed for dive entry is 350 - 400 km/h
- Slant range for opening fire is 1460 m
- AGL for opening fire is 500 m
- AGL to exit the dive is 440 m
- Gs during dive exit is 3.5 - 4
- AGL minimum for level flight after dive exit is no less than 250 m

The target is a group of four MiG-15s in a 30 meter diameter circle. The center of targets is at azimuth of 276° and distance of 72 km. The attack ingress course will be 276°. The target area is marked with red smoke.

The elevation of Maykop airfield is 180 m above sea level (MSL) and the target area elevation is 50 m. This means that targets are 130 meters lower than airfield, and that should be taken into account. This difference should be entered into the barometric altimeter (VD-20) to ease maintaining required altitudes at the control points when manoeuvring.

Using the amendments, the altitudes on VD-20 are equal to:

- Altitude while flying over the target is 470 m
- Altitude when beginning the combat turn is 170 m
- Altitude to start dive is 970 - 1070 m
- Altitude to open fire is 370 m
- Altitude to exit the dive is 310 m
- Altitude minimum for level flight after dive exit is no less than 120 m

After the task is performed, turn towards the RSBN beacon and perform your initial approach and landing .

EXECUTION

After takeoff climb to 200 meters, simultaneously accelerating to IAS of 500 km/h, reach SP (river along forest edge, behind outer NDB).

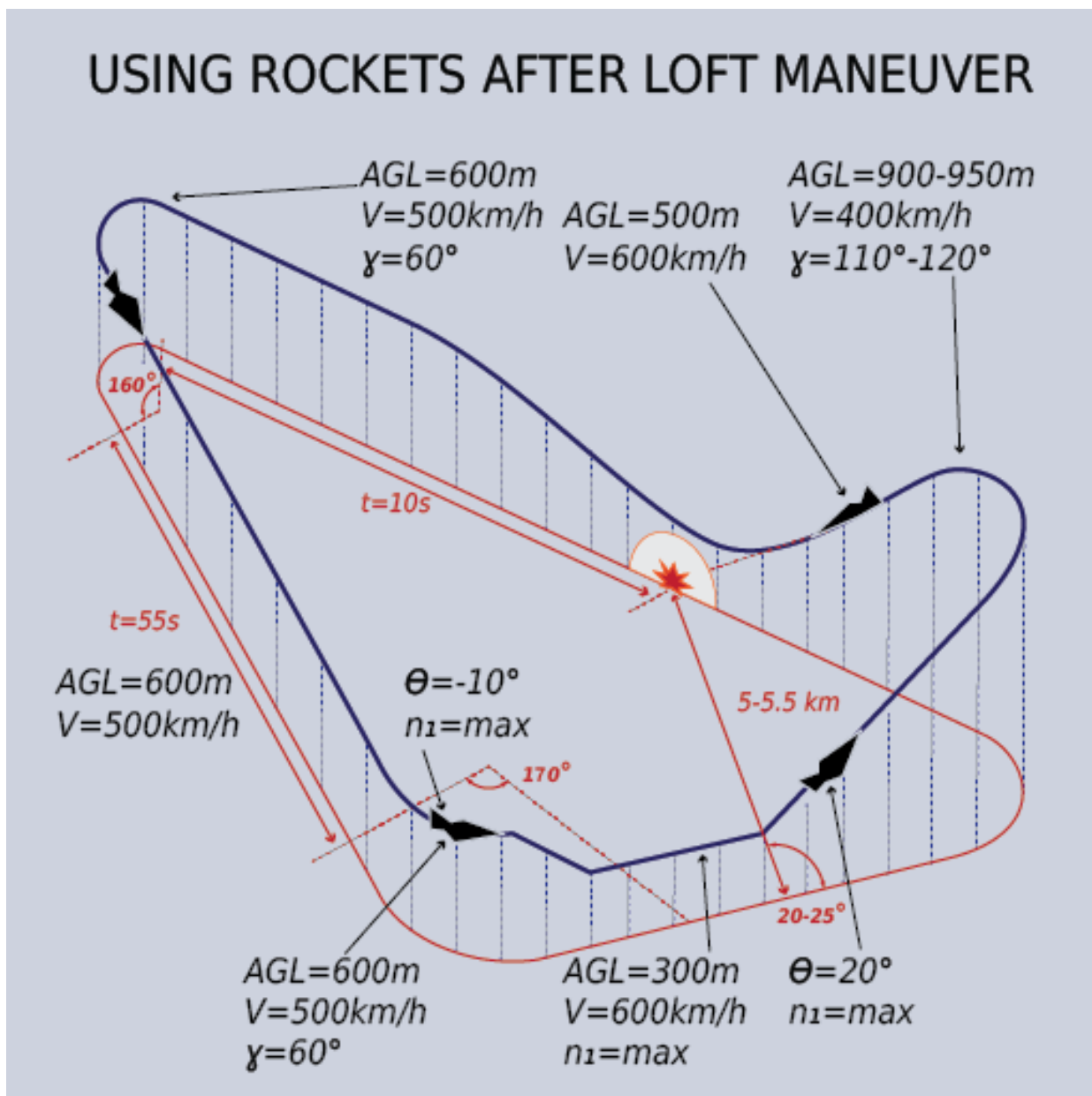
Over SP turn to the right at a course of 282° to flight towards WPT (northern part of Bakinskaya village A=276° D=60km) climbing to altitude of 600 m.

Passing the SP, use the course knob to set a course of 276°.

Before reaching the WPT, set up the armament panel:

- On the armament control panel, enable ACBS: ARMS (ОРУЖИЕ), UB-16 (УБ-16), ASP-FKP (АСП-ФКП)
 - Switch the 2RS-AUT-4RS set to the 4RS (4РС) position
- On the gunsight:
- Set the deflection of the reflector to 2.00° and adjust seat height such that the central dot of gunsight reticle is seen in the center of the reflector
 - Set a fictitious target base of 17 m
 - Set the GYRO-FIXED switch to the GYRO (ГИРО) position
 - Enter the minimum distance to the gunsight

To reach the WPT, control heading deviation of the pointer relative to the circle and keep the distance value close to the given one and time-of-flight.



Once over the WPT, turn to the left to the attack ingress course (course pointer set by course knob) and fly to an altitude of 470 meters (AGL=600m). After target has been identified, fly over the target and start the stopwatch. After 10 seconds, turn to the left with 60° roll at angle of 160° (course of 116°).

After turning to a course of 116° , toggle the stopwatch (triple right crown button click) and fly in a straight line while maintaining an altitude of 470 m and an airspeed of 500 km/h. After 55 seconds, turn to the left with a 60° roll at an angle of 170° (course of 306°) to be on the auxiliary course.

To identify target as early as possible while turning to the auxiliary course, your main attention should be placed on observing the terrain in the direction of the turn with short glances to the instrument panel to monitor the flight parameters.

As soon as target is behind the gunsight bracket (fig. 3), remove roll and begin descending with angle of 10° , increase RPM to maximum, and fly to an altitude of 170 m (AGL=300m) while accelerating to 600 km/h.



At this altitude, the angle of target should be $10-15^\circ$, and the auxiliary course should be different from the combat course by 30° . On this course, clarify the course to the WPT using the RMI (course of 306°) and observe the target moving to the far corner of the instrument panel cover (fig. 4).



When target moves toward the far corner of the instrument panel cover (view angle of 20-25° distance to target 5-5.5 km), begin climbing with a pitch angle of 20°.



While climbing, the target will move to lower corner of the front cockpit frame (fig. 5), and to maintain visual contact with the target, lean to the left.

Once at an altitude of 770-820 meters (AGL=900-950m, the target is seen in the lower corner of the of the front cockpit frame), by increasing roll to 100-120°, exit from the maneuver and begin diving. Airspeed at the apex should be no less than 350 km/h.

Turn and dive entry should be performed in such a way that the reticle centermark is placed under the target. Sideslip of the aircraft in the direction of turn should be compensated for by the opposite roll and set RPM of 95%.

Toggle the weapon arming trigger, put the centermark of reticle over the target, and enter maximum target distance on the gunsight. Keep a steady dive, and keep the centermark of the reticle over the target. At an altitude of 370 meters (AGL=500m, which corresponds to the moment when the transverse dimension of the target fits within the circle formed by the diamonds of the reticle), press the weapon release trigger once with duration of 1 second to fire the rockets.

After firing, exit the dive with a simultaneous increase of RPM to a maximum and climb with pitch of 10-15° while starting the stopwatch. Reach an altitude of 470 meters (AGL=600m), set speed to 500 km/h, and after 10 seconds, reverse course for a follow-on attack.

When there are no more rockets or all four targets have been destroyed, begin climbing with simultaneous turn towards the RSN beacon. After this turn, flip the weapon arming trigger to disable the armament. Set a course for landing at 219°.

After airfield is identified, perform an approach and landing.

Flight conditions: Clear weather conditions

Flight altitudes: 200 - 1200 m

Landing course: 219°

RSN: 34-Navigation and 36-Landing

Air Traffic Controllers:

- ATC Maykop: channel 4

- ATC weapon range: channel 6

6. STRAFE AFTER A HALF-LOOP

Gun strafe attack against ground targets after a complex maneuver (half-loop).

In this lesson we will practice:

- Ingress to the weapons range
- Set up armament control panel
- Maneuvering prior to strafing ground targets after a half-loop
- Aiming and firing
- Egress the weapon range

Conditions for a gun strafe with a dive angle of 20°:

- Depression angle on gunsight is 1°25'
- AGL while flying over the target is 100 m
- AGL when beginning the half-loop is 100 m
- IAS for half-loop entry is 600 km/h
- Slant distance to opening fire is 1460 m
- AGL when opening fire is 500 m
- IAS when opening fire is 500 km/h
- AGL when starting dive exit is 440 m
- Gs during dive exit is 3.5 - 4
- Altitude minimum for level flight after dive exit is no less than 250 m
- AGL for follow-up attack run is 250 m

The target consists of four buses placed inside a 30 meter diameter circle. The center of target is at an azimuth of 276° and a distance of 72 km. The auxiliary course is 276°, with an attack ingress course is 96°. The targets are marked with red smoke.

The elevation of Maykop airfield is 180 m above sea level (MSL) and the target area elevation is 50 m. This means that targets are 130 meters lower than airfield, and that should be taken into account. This difference should be entered into the barometric altimeter (VD-20) to ease maintaining required altitudes at the control points when manoeuvring.

Using the amendment, the VD-20 altitudes are equal to:

- Altitude to open fire is 370 m
- Altitude to exit dive is 310 m
- Altitude minimum for level flight after dive exit is no less than 120 m
- Altitude for follow-on attack is 120 m

The altitude over target and altitude for the half-loop entry should be controlled with help of the RV-5M.

After task is performed, turn towards RSBN beacon and perform an initial approach and landing.

EXECUTION

After takeoff, climb to 200 meters while simultaneously accelerating to 350 km/h IAS. At a distance of 5 km, turn left to the downwind leg with a roll of 45° to reach SP (Rodnikovyy). The SP is located abeam of the runway 4 threshold. On downwind leg, accelerate to 500 km/h.

Once over the SP, turn to the right for a course of 282° to fly towards WPT (northern part of Bakinskaya) while climbing to altitude of 600 m. After the SP, use the course knob to set the course pointer to 276°. Follow the given azimuth by keeping the course pointer inside central circle.

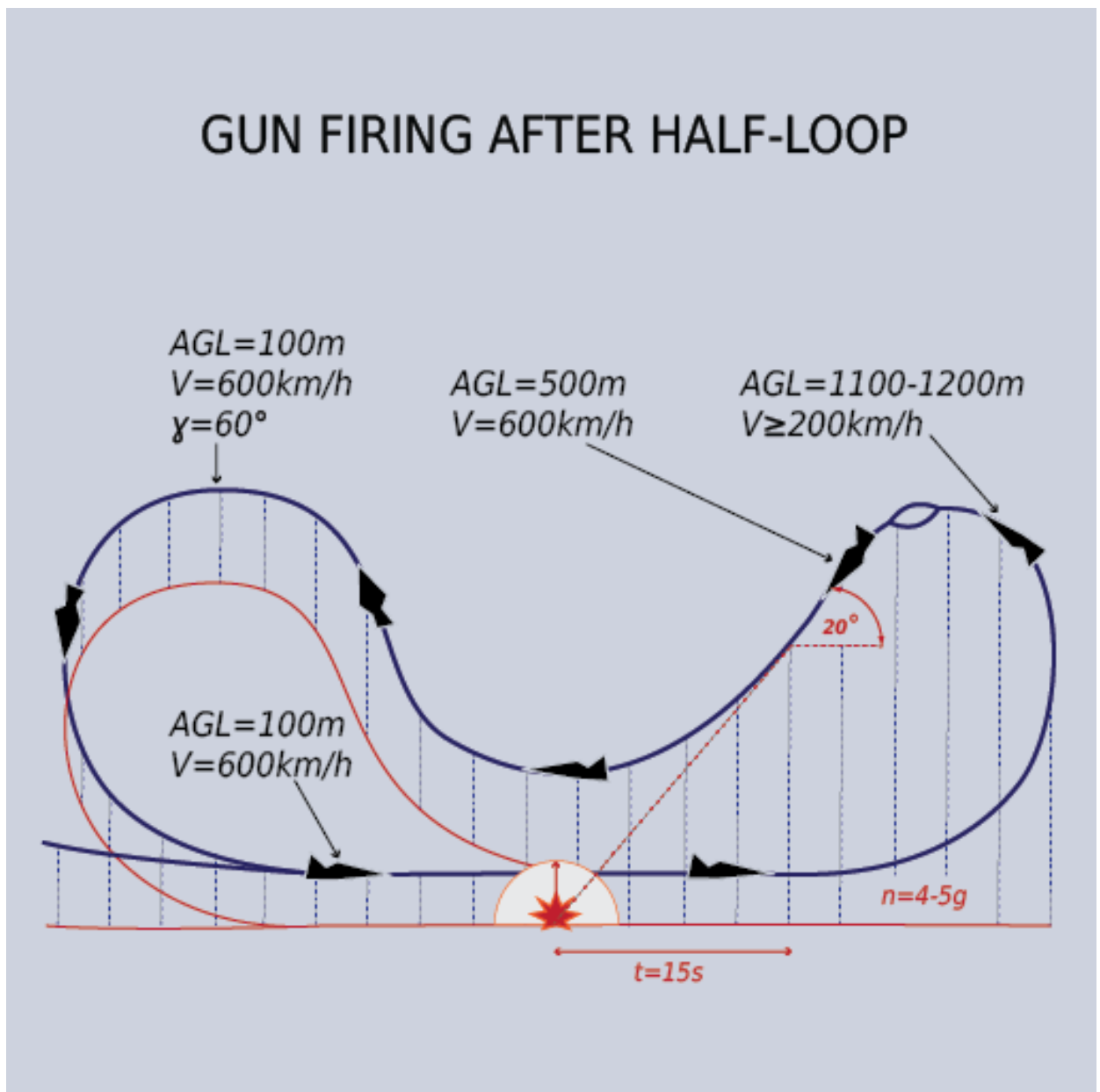
Prior to reaching the WP, prepare the armament control panel:

- On the main CB panel, enable the ARMS (ОРУЖИЕ) CB
- On the GM and GS-23 panels, enable the CANNON GS (ПУШКА ГШ) CB
- On the center panel, enable LAUNCH (ПУСК) and ASP (АСП)

On the gunsight:

- Set the deflection of the reflector to 1.25° and adjust seat height such that the central dot of gunsight reticle is seen in the center of the deflector
- Set the fictitious target base to 17 m
- Set the GYRO-FIXED switch to the GYRO (ГИРО) position
- Enter the minimum distance on the gunsight

On the armament control panel, press the EXPL. CHARGE GS (ЗАРЯД ГШ) button.



Reaching the WP can be determined by the distance on the PPD-2 and the time flown on this leg. When over the WP, continue flying with a course of 276° (already set on RMI) and descend to AGL of 100 m. After the target has been identified, adjust your course. Once over the target, start the stopwatch, and after 15 seconds, increase engine RPM to the maximum. Enter a half-loop and attain a G-factor of 4-5 at pitch of $50-60^\circ$. Keep pulling back the stick to keep angular speed of the airplane constant. The IAS at the apex of the half-loop should be no less than 200 km/h and altitude of 1200-1300 m. During the maneuver, do not over-control and allow the aircraft to buffet. The attitude of the aircraft can be controlled with help of the ADI and natural horizon.

When the aircraft has reached its apex in the half-loop, check IAS, speed and attitude of the aircraft relative to the natural horizon. Reduce RPM to 90%. Look for the target when the aircraft's nose is close to the horizon.



Once passing the apex of the half-loop, identify the target with help of visual references. At the moment the target is close to the upper edge of the gunsight deflector (fig. 3), neutralize the stick, hold the pitch constant, and by deflecting the stick precisely to the side to perform a half-roll. Once the half-roll is finished, the dive angle should be no more than 25°.

The direction of the half-roll depends on the position of the target relative to gunsight. After the half-roll, the aircraft will slide in the direction of the turn. Compensate this slide with the opposite roll. Fly to place the centermark of reticle under the target. Flip the weapon arming trigger, place the centermark of reticle on the target, and enter maximum distance on the gunsight. Keep the dive steady and hold the centermark of reticle on the target.

At an altitude of 370 meters, (AGL=500m, which corresponds to the target fitting within the circle formed by the diamonds of the reticle), press combat trigger once for one second to fire the gun.

Immediately after firing, exit from the dive while simultaneously increasing engine RPM to maximum. Exit the dive at an altitude of no less than 120 m (AGL=250m) and a speed of 600 km/h. Fly over the

target for a follow-on attack run. Over target, start the stopwatch, wait for 10 seconds and turn to the right with speed of 600 km/h and a roll of 60 at an angle of 90°. After this turn, roll to the left at 60 for an auxiliary course of 276°. On this course, identify the target, adjust direction, descend to AGL of 100 meters, approach the target, and repeat maneuver.

When there are no more gun or all four targets are destroyed, begin climbing with simultaneous turn towards RSNB beacon. After this turn, flip the weapon arming trigger up, disable the armament, and a landing one 39°.

After the airfield is identified, perform an approach and landing.

Conditions: Clear weather conditions

Flight altitudes: 100 - 1200 m

Landing course: 39°

RSNB: 34-Navagation and 36-Landing

Traffic controllers:

- ATC Maykop: channel 4

- ATC weapon range: channel 6

7. BOMBS DELIVERY AFTER A HALF-LOOP

Bombing after a complex maneuver like a half-loop.

In this flight we will practice:

- Ingress to the weapon range
- Set up the armament control panel
- Maneuvering prior to bombing after a half-loop
- Dive bombing
- Egress the weapons range

Conditions for bombing with a 40° dive bombing angle:

- Depression angle on gunsight to 10°
- AGL flying over the target and starting the half-loop is 100 m
- IAS for half-loop entry is 600 km/h
- AGL for bombing is 1100 m
- IAS for bombing is 500 km/h
- AGL at start of dive exit is 1000m
- Gs during dive exit is 4-5
- AGL minimum of level flight after dive exit is no less than 500 m
- AGL for follow up attack is 500 m

The target is a rectangular area, located at an azimuth of 276° and a distance of 72 km. It is marked with red smoke.

The elevation of Maykop airfield is 180 m above sea level (ASL); the targets elevation is 50 m. This means that the target is 130 meters lower than the airfield and this should be taken into account. This difference should be entered into the barometric altimeter (VD-20) to ease maintaining required altitudes at the control points during maneuvers.

Using the amendments, the altitudes on VD-20 should be:

- Altitude for flying over the target and starting the half-loop is 370 m
- Altitude for bombing is 970m
- Altitude to start dive exit is 870 m
- Hvd minimum flight level after dive exit is no less than 370 m
- Altitude for follow up attack is 370 m

After the task is performed, turn towards the RSBN beacon and perform an initial approach and landing .

EXECUTION

After takeoff, climb to 200 meters and accelerate to 350 km/h. At a distance of 5 km, turn left to the downwind leg with a 45° roll to reach the SP (Rodnikovyy), which is located abeam of the runway 4 threshold. On downwind leg, accelerate to 500 km/h.

Once over the SP, turn to the right to a course of 282° and fly towards the WPT (northern part of Bakinskaya) while climbing to altitude of 600 m. After the SP, use the course knob to set the course pointer to 276°. Follow the given azimuth by keeping the course pointer inside central circle.

Prior to reaching the WP, prepare your weapons:

- On the main CB panel, enable the ARMS (ОРУЖИЕ) CB
- On the center panel, enable: LAUNCH (ПУСК), ASP (АСП) and BOMBS (БОМБЫ)

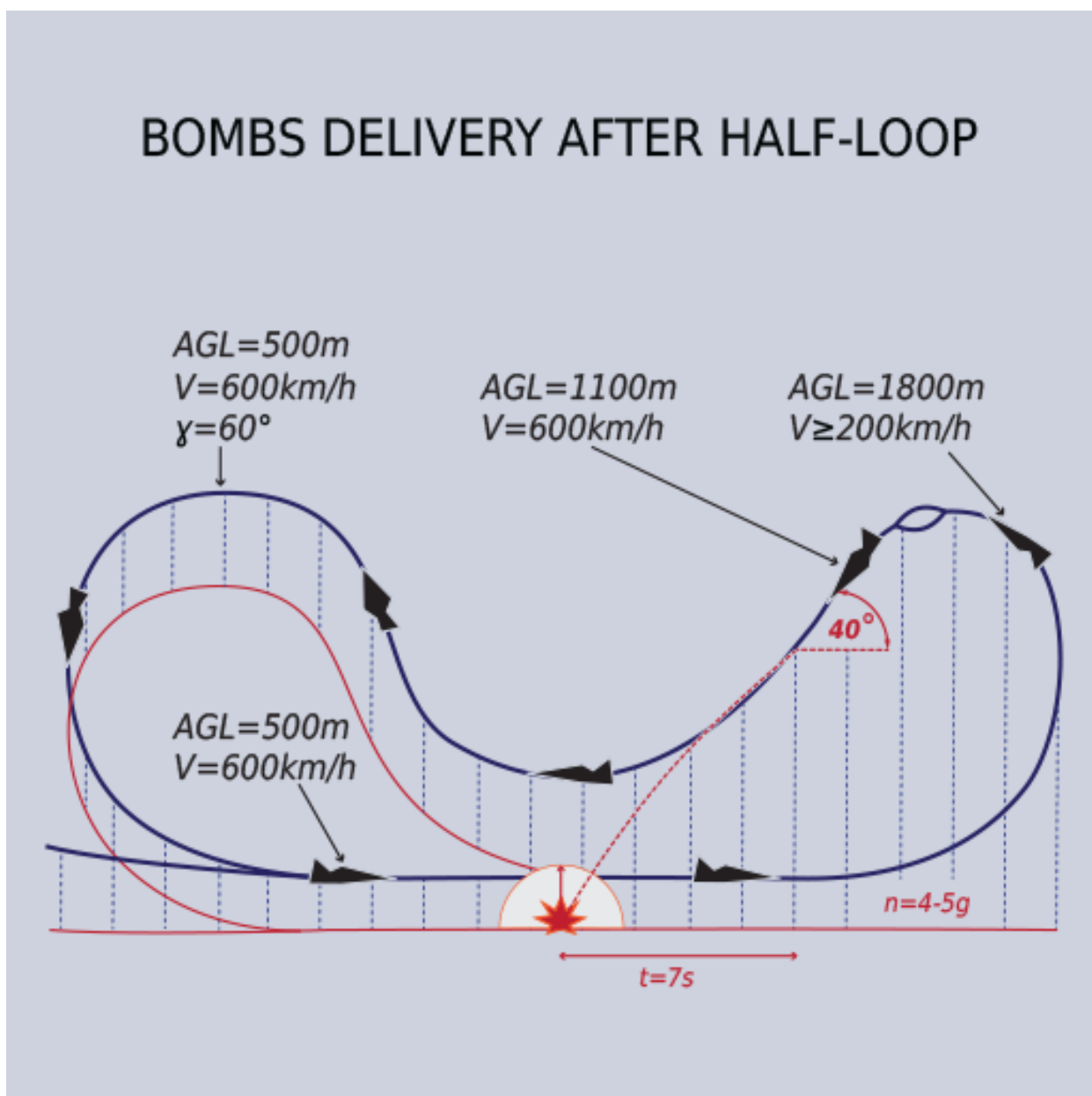
On the gunsight:

- Set the deflection of the reflector to 10° and adjust seat height so the central dot of gunsight reticle is

seen in the center of the deflector

- Set a fictitious target base of 15 m
- Set the GYRO-FIXED switch to the FIXED (НЕПОД) position
- Enter the maximum distance to the gunsight

On the armament panel by the left WEAPON CARRIER (ВЫБОР ДЕРЖАТЕЛЯ) button, select the outboard pylons and set the BOMBS TRAIN.-1-SALVO (БОМБЫ СЕРИЯ-1-ЗАЛП) switch into SALVO (ЗАЛП) position.



Reaching the WP can be determined by the distance on the PPD-2 and the time flown on this leg. When over the WP, continue flying on a course of 276° (already set on RMI) and a AGL of 370 m, simultaneously accelerating to 600 km/h. After the target has been identified, adjust your course. Over target, start stopwatch, and after 7 seconds, increase RPM to the maximum. Enter a half-loop and reach a G-factor of 4-5 with a pitch of $50-60^\circ$. Keep pulling the stick to keep the angular speed of the aircraft constant. The IAS at the apex of the half-loop should be no less than 200 km/h and an altitude of 1700-1800 m. During the maneuver, do not over-pull on the stick and keep the aircraft from shaking. The attitude of the aircraft can be controlled with help of ADI and natural horizon.

When the aircraft has reached its apex of the half-loop, check the IAS, speed and attitude of the aircraft relative to natural horizon. Look for the target when the nose of the aircraft is close to the horizon.



Once the apex of the half-loop has been passed, identify the target with help of visual references. At the moment when target is close to the canopy frame (fig. 3), push the stick to neutral, stabilize pitch and deflect the stick to the side (transverse movement) to perform a half-roll (aileron roll). Once the half-roll is finished, the dive angle should be around 40-45°.

The direction of the half-roll depends on the position of the target relative to deflector of the gunsight: if the target is to the right side, deflect stick to the right and vice versa. After the half-roll, the aircraft will slide in the direction of the turn. Compensate this slide with the opposite roll.

Adjust your attack ingress course, fly to place the centermark of reticle on the target, and flip the combat trigger.

At an speed of 400 km/h, set the RPM to idle.

Keep a steady dive and hold the centermark of reticle on target.

At an altitude of 970 meters (AGL=1100m, the target fits inside the circle formed by the diamonds of the reticle), press combat trigger once for a duration of 1 second to release the bombs.

Immediately after release, exit from the dive while simultaneously increasing RPM to a maximum. Exit the dive at an altitude of no less than 370 m (AGL=500m) and a speed of 600 km/h. Fly over the target for a follow up attack. Once over the target, start stopwatch and wait for 10 seconds. After 10 seconds, turn to the right with an airspeed of 600 km/h, and a roll of 60 at angle of 90°. After this turn, take the

auxiliary course of 276° . On this course, identify the target, adjust direction, and approach the target to repeat the maneuver. On the armament panel, disable the left WEAPON CARRIER (ВЫБОР ДЕРЖАТЕЛЯ) button and the corresponding right button for the inner pylons.

When all bombs were released, begin climbing with simultaneous turn towards the RSBN beacon. After this turn, flip the combat trigger up, disable the armaments, and set course for landing at 39° . After the airfield is identified, perform an approach and landing.

COMMON ERRORS DURING A BOMB RUN (actual and calculated values)

Errors in release altitude:

If H_{act} is more than H_{calc} , the bombs land short

If H_{act} is less than H_{calc} , the bombs will land long

An error in release altitude of 50 meters will cause a deviation from calculated hit point by 30 meters.

Error in dive angle:

If Θ_{calc} is more than Θ_{act} , the bombs will fall short

If Θ_{calc} is less than Θ_{act} , the bombs will fall long

An error in the dive angle of 1° will cause a deviation from the calculated hit point by 10 meters.

An error in speed at the moment of bomb release:

If V_{act} is more than V_{calc} , the bombs will fall short

If V_{act} is less than V_{calc} , the bombs will fall long

An error in speed of 20 km/h will cause a deviation from the calculated hit point by 10 meters.

Conditions: Clear weather conditions

Flight altitudes: 100 - 1800 m

Landing course: 39°

RSBN: 34-Navigation and 36-Landing

Air Traffic Controllers:

- ATC Maykop: channel 4

- ATC weapon range: channel 6

8. INTERCEPTING AN AERIAL TARGET AT HIGH ASPECT

Practice high aspect interception of an aerial target with AWACS guidance.

In this lesson we will practice:

- Ingress to the air patrol area
- Communications with an AWACS for target high aspect interception guidance
- Visual target identification
- Maneuver to the rear hemisphere of the target
- Missile launch from target rear aspect
- Return to airfield

A radio-controlled MiG-15 will be used as the target.

The center of the patrol area is Bakinskaya (A=276° D=60km).

Maneuver in the patrol area: orbiting at H=2100 with the left roll of 30° at a speed of 500.

EXECUTION

After takeoff, climb to an altitude of 200 m and accelerate to 350 km/h. At a distance of 5 km, turn to the left to a course opposite to a landing course with a roll of 45° to reach the SP, village of Rodnikovyy. Once on this course, accelerate to 500 km/h. Once at A=276° D=3km, turn to the right to a course of 276° with 45° roll, and climb to 2100 meters and fly to the patrol area following given azimuth.

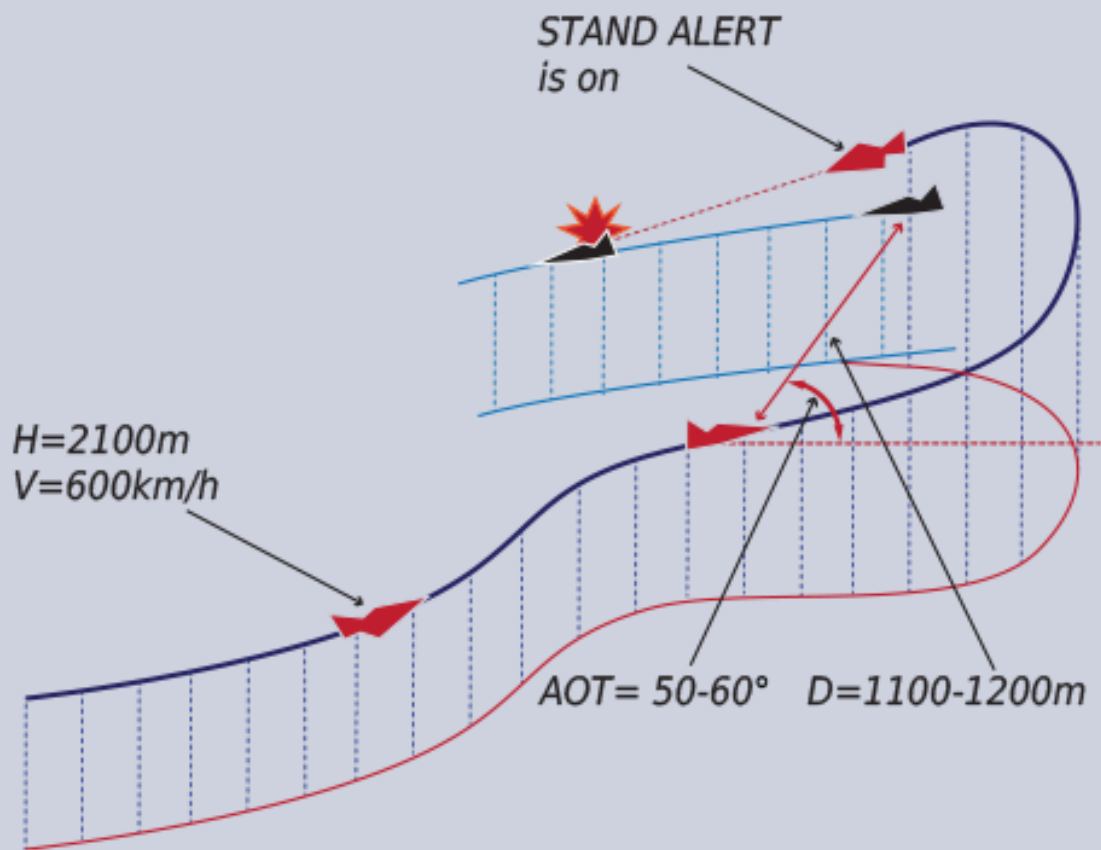
Once at the center of patrol area, wait for AWACS guidance and prepare weapon:

- On the main CB panel, enable ACB ARMS (ОРУЖИЕ)
- On the R-3S, R-69 and GS-23 control panel, enable GLOWING ON (НАКАЛ) ACB, and using the VOLUME (ГРОМКОСТЬ) knob, set the maximum volume
- On the center armament panel, enable the ASP (АСП) and MISSILE (ПАКЕТЫ)
- On the armament panel by the A-A PORT.-STARB (СС ЛЕВАЯ-ПРАВАЯ), select the missile to launch and press the left WEAPON CARRIER (ВЫБОР ДЕРЖАТЕЛЕЙ) button to select outboard pylons

On the gunsight:

- Set the deflection of the reflector to 0°
- Set the fictitious target base of 10 m
- Set the GYRO-FIXED switch to the FIXED (НЕПОД) position
- Enter the minimum distance to the gunsight

INTERCEPT OF AERIAL TARGET



Once you receive guidance commands from AWACS, set airspeed to 600-650 km/h and maintain an altitude of 2100 meters. When following AWACS orders, monitor your forward hemisphere from left to the right at your altitude and above.

After visual identification of the target, report it and continue closing. Once permission to attack target is received, enable the the HEATING ON (ОБОГРЕВ) and LAUNCH (ПУСК) ACBs.



After the “MERGED” message from AWACS, turn to an intercept course. This course will be given by the instructor. After this turn, the target will appear to the left of the gunsight.

Once a view angle to the target is 50-60° (figure 3), increase RPM to maximum and turn toward the target while simultaneously climbing to find yourself in the rear hemisphere of the target. If this maneuver is performed properly, distance between you and the target at the start of the maneuver should be 1200-1300 meters. While turning, try not to lose sight of the target.

Once in the rear hemisphere of target, aim the missile by flying to place the the centermark of reticle over target. This will allow the heat-seeker of the missile to lock the target. After the target has been locked (missile seeker lock audio signal), flip the combat trigger down, make sure that the STAND ALERT is on, and launch the first missile.

After the target has been destroyed, turn to the right to the NDB course and descend to 2100. Disable weapon controls and set landing course on RMI. At 10 km from RSNB beacon, set airspeed to 350 km/h.

After the NDB has been passed, start the stopwatch and turn to the right with a 20° roll on a course of 231°. The moment you fly-over-the-beacon is indicated by the course deviation pointer on RMI crosses the circle in the center. Once on this course, take an altitude of 1500 m.



Once you pass the beacon, fly 10 km. Use the needle with circle on its end and the moving scale on the RMI to determine deviation from an azimuth of 231°. Adjust your course if necessary (figure 4). Course adjustments should be equal to the amount of deviation. If the actual RSBN beacon azimuth is larger than a given one, than the aircraft is to the right of the required flight path (adjust course to the left). If actual azimuth is less than a given one, you are to the left of required flight path (adjust course to the right).

Once you reach the point to turn where the landing course should be started (when $A=231^\circ$ $D=35$ km $T_{flight}=06:00$ min), enable LANDING mode and turn to the landing course with a 20° roll.

Once on the landing course, perform 30-second level flight at which:

- Set engine RPM to 80%
- Using the glideslope and heading deviation pointers, determine the position of the aircraft relative to the runway axis and adjust course accordingly
- At an airspeed of 330 km/h, extend landing gear
- At an airspeed of 280 km/h, extend flaps to the takeoff position
- Increase engine RPM to 88-90%
- At $D=30$ km, begin descending with a vertical speed of 3-4 m/s and an airspeed of 280 km/h

Descend along the radio glide slope while maintaining a vertical speed of 3-4 m/s. This should result in the following control points (distance/altitude): 30/1500, 20/1000, 12/600, 10/500, 8/400, 6/300, 4/200, 2/100.

At a distance of 6 km from the runway, fully extend the flaps, increase RPM to 90-92%, set vertical speed to -1-2 m/s, and trim the aircraft for an IAS of 260 km/h.

The outer NDB should be passed at H=200-220m and an airspeed of 260 km/h. The fly-over moment is determined with help of audio signal, blinking of the MARKER signal lamp, and the ADF switching automatically to the inner NDB. Continue descending towards inner NDB while following the radio glideslope.

The inner NDB should be passed at H=80-60 m and an airspeed of 230 km/h. Once the inner NDB passed, adjust flight parameters if needed and land.

If you cannot visual identify the runway after passing the inner NDB, your altitude is out of parameters, or otherwise unsafe, perform missed approach procedure according to the 2x180 pattern.

Retract gear and flaps, accelerate to 350 km/h while simultaneously climbing to at an altitude of 300m. Turn to the downwind leg with 20° roll and continue climbing to 600 m. Once on downwind leg, set the LANDING-NAVIG.-GLIDE PATH (ПОСАДКА-НАВИГАЦ.-ПРОБІВ.) switch to the NAVIG (НАВИГАЦ.) position.

Once abeam of the RSBN beacon, start the stopwatch. After 3 minutes and 20 seconds, set the LANDING-NAVIG.-GLIDE PATH switch to the LANDING (ПОСАДКА) position and turn to the landing course with 20° roll at an airspeed of 350 km/h.

Once on the landing course, follow the normal landing procedure described above.

Conditions: Adverse weather conditions

Flight altitudes: 2100 - 3000 m

Landing course: 39°

RSBN: 34-Navigation and 36-Landing

Traffic controllers:

- ATC Maykop: channel 4

- ATC Sokrat-Podhod: channel 9

9. AERIAL RECONNAISSANCE

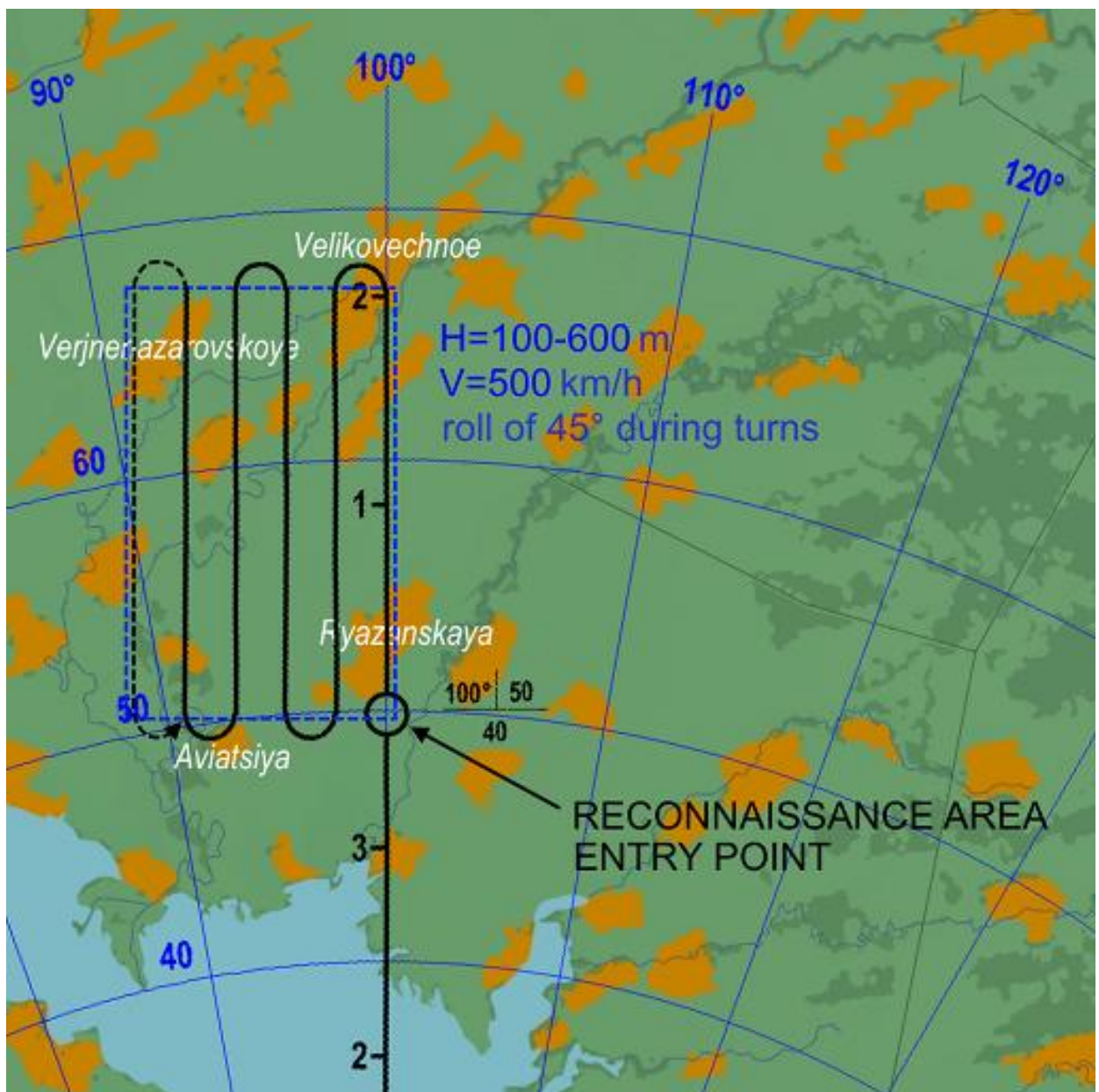
Practice aerial reconnaissance and searching for ground targets in a given area.

In this flight, we will practice:

- Ingress to the reconnaissance area
- Searching for and identifying ground objects
- Egressing the reconnaissance area

As a reconnaissance target, a battery of MLRS "Smerch" will be used. It should be located within 40 minutes after arriving in the reconnaissance area.

A tactical reconnaissance pattern, known as "Sequential leg scanning", will be used.



Using this pattern, the reconnaissance area is scanned by flying several parallel legs. Each sequential leg is followed by a 180° turn (figure 2).

The reconnaissance area has a dimension of 10x17 km and is divided into five parallel legs. The search area is bound by four villages: Aviacia-Ryazanskaya-Velikovechnoe-Verhnazarovskoye, and these are

market on the flight plan by the blue dashed line. Parallel legs should be flown with a course of either 100° or 280°. Time on each leg is two minutes.

When flying with a course of 100°, U-turns (at 180° to find yourself on the next leg) are performed to the left with a course of 280° - to the right. When on a course of 100°, observe the area ahead and to the left along the leg course of 280° ahead and to the right. To scan the whole search area, you will need to fly five legs and perform 4 turns.

The aircraft is considered in search area when on an azimuth of 100° and distance of 50 km. While performing the search, maintain the following parameters: IAS - 500 km/h, AGL=100-600 meters, and rolls during turns is 45°.

EXECUTION

Set navigation channel 40 on the RSBN. After takeoff, climb to 600 meters and accelerate to 500 km/h. Set the course on the RMI to 100°. With help of RMI, fly a radial (100) and fly 50 km to reach the assigned search area.

When approaching to the search area, ask Sokrat-Podhod air traffic controller for clearance and set the altimeter to the pressure provided by the controller.

At a distance of 50 km, start the stopwatch and start searching for targets using the described search pattern. If within 2 minutes no targets are found, turn to the next leg and continue until all five legs are flown.

If a target is identified, you should fly over it at an altitude of 100 meters and report it within 20 seconds.

If target is found after the fifth leg, turn to the left on a course of 280° to re-scan the fifth leg. This maneuver is marked with the black dashed line on the flight plan.

After two minutes, turn to the left on a course of 100° to fly the next leg. In the follow-up pattern (from 5th to the 1st leg), when flying with course of 100°, turn to the right at angle of 180° with a course of 280° to the left. At a course of 100°, observe area ahead and to the right along the leg, at a course of 280° ahead and to the left.

Conditions: Simple weather conditions

Flight altitudes: 100 - 2100 m

RSBN: 40-Navigation and 38-Landing

Traffic controllers:

- ATC Krasnodar: channel 17

- ATC Sokrat-Podhod: channel 9

Maykop-Khanskaya air base details:

Callsign: "Sokrat"

Runway: 3107x60

Landing course: 39°

RSBN: 34-Navigation and 36-Landing

Inner-NDB: 289 KHz

Outer-NDB: 591 KHz

ATC channel: 4

10. EVALUATION FLIGHT

This lesson will evaluate your skills regarding the combat employment of the L-39 against ground and air targets.

Your objectives will be provided prior to takeoff.

The parameters for weapon delivery using various attack maneuvers are listed below. Maneuver plans are provided in the briefing images.

Conditions for rocket delivery with a 20° dive angle after a loft maneuver or combat turn:

- Depression angle to be set on the gunsight is 2.00°
- Fictitious target base is 17 m
- AGL when flying over the target is 600 m
- IAS over the target is 500 km/h
- AGL when beginning the combat turn is 300 m
- IAS when beginning a combat turn is 600 km/h
- Slant distance to open fire is 1460 m
- AGL to open fire is 500 m
- AGL to start dive exit is 440m
- Gunsight mode GYRO (ГИРО)
- Distance entered into the gunsight - maximum.

Conditions for gun strafe using a 20° dive angle after a half-loop:

- Depression angle to be set on the gunsight is 1.30°
- Fictitious target base is 17 m
- AGL when flying over the target is 100 m
- IAS over target is 600 km/h
- AGL at start of a half-loop is 100 m
- IAS for half-loop entry is 600 km/h
- Begin the half-loop 15 seconds after the target has been passed
- Slant range to open fire is 1460 m
- AGL to open fire is 500 m
- IAS to open fire is 600 km/h
- AGL to exit the dive is 440m
- Gunsight mode GYRO (ГИРО)
- Distance entered into the gunsight - maximum.

Parameters for launching an R-60 missile at an aerial target:

- Depression angle to be set on the gunsight is 0°
- Fictitious target base is 10 m
- Gunsight mode FIXED (НЕПОД)
- Distance entered into the gunsight - maximum.

Parameters for level bombing using OFAB-100 "Jupiter":

- Depression angle to be set on the gunsight is 11°
- AGL at bomb release is 100m
- Release speed is 600 km/h
- Release mode SALVO (ЗАЛП)
- Gunsight mode FIXED (НЕПОД)
- Distance entered into the gunsight - minimum.

Conditions for FAB-100 40° dive bombing after a half-loop:

- Depression angle to be set on the gunsight is 10°
- Fictitious target base is 15 m
- AGL when flying over the target is 100 m
- IAS over target is 600 km/h
- AGL to start the half-loop is 100 m
- IAS to start the half-loop is 600 km/h
- Begin the half-loop 7 seconds after the target has been passed
- AGL for bomb release is 1100 m
- IAS for bomb release is 500 km/h
- AGL to begin dive exit is 1000m
- Release mode SALVO (ЗАЛП)
- Gunsight mode FIXED (НЕПОД)
- Distance entered into the gunsight - minimum.

Conditions: Simple weather conditions

Flight altitudes: 100 - 3500 m

Landing course: 219°

RSBN: 34-Navigation and 36-Landing

Air Traffic Controllers:

- ATC Maykop: channel 4
- ATC WEAPON RANGE: channel 6
- ATC Sokrat-Podhod: channel 9

Backup airfield: Krasnodar-Center

Landing course: 267°

RSBN: 40-Navigation and 38-Landing

ATC Krasnodar: channel 17

11. FERRY FLIGHT

Deliver an L-39 to Mozdok air base.

To increase the number of L-39s at Mozdok air base, two L-39ZAs (armed with 2xUB-16 and 2xFAB-100) are to be delivered. Fly there as part of a two ship by following the route Maykop-Mozdok.

Henroute=3900

Vtrue=500

Flight members:

leader - 015

wingman - 020

Formation:

interval: 300

distance: 300

Only taxi after the flight lead does.

Takeoff one at a time. At a distance of 4 km on PPD, turn to the right on a course of 99° and climb to 600. Join up while enroute. Your flight should be formed up over Kozhurskaya. During this flight, follow the lead and follow all of his orders.

At about 120-100 km from the landing airfield, request approach details. Prior the first turn into the the circle pattern, break formation and land separately.

Conditions: Simple weather conditions

Flight altitudes: 600 - 3900 m

Landing course: 219°

RSBN: 34-Navigation and 36-Landing

Air Traffic Controllers:

- ATC Maykop: channel 4

- ATC Sokrat-Podhod: channel 9

Mozdok air base details:

Callsign: "Raspiska"

Runway: 3100x80

Landing course: 83°

RSBN: 20-Navigation and 22-Landing

Inner-NDB: 525 KHz

Outer-NDB: 1065 KHz

ATC channel: 19

The backup airfield for aircraft delivery flight will be Beslan.