<table>
<thead>
<tr>
<th>Time</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>I, (b)(3), (b)(6), (b)(7)c have assumed the duties and responsibilities of MLM VMM-261 ODO. I have in my possession (5) bricks and (1) sticks.</td>
<td>MLM</td>
</tr>
<tr>
<td>1015</td>
<td>GT 30 outbound for E card.</td>
<td>MLM</td>
</tr>
<tr>
<td>1045</td>
<td>GT 30 SOD ENBO.</td>
<td>MLM</td>
</tr>
<tr>
<td>1100</td>
<td>GT 31 OB Northern route.</td>
<td>MLM</td>
</tr>
<tr>
<td>1410</td>
<td>GT 31 SOD ENBO.</td>
<td>MLM</td>
</tr>
<tr>
<td>1430</td>
<td>GT 31 OB.</td>
<td>MLM</td>
</tr>
</tbody>
</table>

(b)(3), (b)(6), (b)(7)c
OPERATION KILLING TIME / CALS

GHOST 3-1 Flight
CAPT "PYRO" TOMKIEWICZ
18 March 2022

ORIENTATION

- TIME HACK
- ROLL CALL
- SMARTPACK INVENTORY / PEN CHANGES
- MAPS/CHARTS/PUBLICATIONS
- BRICKLOAD (2xROUTE, LOCAL COMM PLAN, WAYPOINTS, OVRLAY)
**SITUATION**

- **Enemy:** None
- **Friendly**
  - Higher: II MEF / 2d MAW
  - Adjacent: MAG 26/29, CR22 Allied Aircraft
  - Supported: II MEF, 2d MAW
  - Mission assets:
    - 1 x MV-22 "Ghost 3-1 flight"
MISSION

- Mission Statement: At 1000Z GHOST 3-1 displaces from ENBO to conduct CALs in order to increase squadron proficiency.
  - Mission Precedence: Routine
  - Specified Tasks: CALs
  - Implied Task: None

- Commander's Intent
  - Purpose: Increase squadron proficiency
  - Endstate: Ghost 31 SOD at ENBO

CONOPS
EXECUTION
Coordinating Instructions

• Mission-Essential Equipment
  – Aircraft: DTED / EAPS
  – Personal: Food/Water for 6.6 hrs of flight
• GO
  – 1 x MV-22
• No-Go
  – 500/1
• Aborts/Waveoffs - SOP

EXECUTION
Coordinating Instructions

• Emergency/System Failures
• IIMC - Reversal
• Terminate / Knock-it-off
• Downed AC
ADMIN AND LOGISTICS

• Delay/Straggle Plan/Drop Dead
  - Delay: 6 hours
  - Drop Dead
    • 1600z for 1+00 of flight time

• Fuel Plan / Fuel required
  - T/O: 10.5
  - Mission: 21.0
  - Joker: 4.2 / 4.5
  - Bingo: 3.4 / 3.7 (LZ – ENBO) / (Royvik - ENBO)
    • Available: ENBO/ENDU/ENVA
  - BINGO NO FLPN: ENBO/2200#/4500'/200KTS
• LOS/Bullseye: ENBO/ENEV/ENST/ENDU reverse on the way back
• Ordnance: TNG/SEMI/PROG-1
• Debrief Location/Time
COMMAND AND SIGNAL

- Chain of Responsibility
  - Authority to change route, LZs – TAC
  - Extension/Schedule change: SOP
- Frequencies
  - Assigned calls:
    - ATC, WX, BASE, AIRSPACE COORD
- Lost Comm / Single Radio Plan
- Chattermark = 21S – 20 – 1
- IFF Procedures/Codes

RM

- Risk to Forces
  - Blue: Poor weather calls with confining terrain and icing.
    - WX < 5000'/5sm at coastal airports = No Inland LAT
    - WX < 1000'/3sm = Conversion Mode
    - WX < 500' / 1sm = No Go
  - Red: Terrain / Icing / Turbulence
- Risk to Mission
  - Blue: Getting behind fuel ladder due to CONV mode Ops.
  - Red: WX
CLEAN UP

QUESTIONS?
**UNITED STATES MARINE CORPS**

**MARINE MEDIUM TILTROTOR SQUADRON 261 (-) REINFORCED, COLD RESPONSE DETACHMENT**

**MARINE AIRCRAFT GROUP 26, 2D MARINE AIRCRAFT WING, FMF**

**POSTAL SERVICE CENTER BOX 21016**

**JACKSONVILLE, NC 28545-1016**

**MISSION:** SUPPORT THE MAGTF COMMANDER BY PROVIDING ASSAULT SUPPORT TRANSPORT OF COMBAT TROOPS, SUPPLIES AND EQUIPMENT, DAY OR NIGHT, UNDER ALL WEATHER CONDITIONS DURING EXPEDITIONARY, JOINT, OR COMBINED OPERATIONS.

**SCHEDULED HOURS**

|------|----------------------------------------|----------------------|------------------|----------|

**ADMIN NOTES:**

- **START END**
  - 0730 0800
  - 0800 1100
  - 1030 1100
  - 1100 1300
  - 1300 1500
  - 1500 1600
  - 1600 1700
  - 1700 1730

- **LOCATION**
  - OPS 5
  - INDIVIDUAL SPACES
  - INDIVIDUAL SPACES
  - INDIVIDUAL SPACES
  - INDIVIDUAL SPACES

- **NOTES**
  - MAINTENANCE MEETING
  - ATO INPUTS FOR NEXT DAY DUE TO MAW
  - MIDRATS FOR AIRCrew
  - SITREP INPUTS DUE TO S-3
  - SITREP DUE TO MAW G3
  - MAINTENANCE MEETING

- **POC**
  - (b)(3), (b)(7)c

**FLIGHT SCHEDULE SATURDAY, 05 MARCH 2022 (2064)**

<table>
<thead>
<tr>
<th>EVENT</th>
<th>TMR</th>
<th>BRF</th>
<th>ETD</th>
<th>ETR</th>
<th>HRS</th>
<th>AIRCREW</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHOST 3-1 MV-22B</td>
<td>2K2</td>
<td>0830</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
</tr>
<tr>
<td>GHOST 3-2 MV-22B</td>
<td>2M4 1A1</td>
<td>0630</td>
<td>0915</td>
<td>1615</td>
<td>6.6</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
</tr>
<tr>
<td>GHOST 3-3 MV-22B</td>
<td>2M4 1A1</td>
<td>0630</td>
<td>0915</td>
<td>1615</td>
<td>6.6</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
</tr>
</tbody>
</table>

**TRAINING CODES**

- CAT DIV LAT / DIV CALS
- CAT DIV LAT / DIV CALS
- CAT DIV LAT / DIV CALS

**MISSION NOTES**

1. BARDUFOSS FUEL COORDINATED AT 1300L. ODO TO CONTACT HMH/HMLA ODO: SIPR 302-750-3983 PRIOR TO DEPARTURE. POC: (b)(3), (b)(6), (b)(7)c
2. PAX AUTHORIZED. COMMSTRAT FAX TO MANIFEST WITH ODO. POC: (b)(3), (b)(6), (b)(7)c
3. AERIAL REFUELING WITH VMGR 252. POC: (b)(3), (b)(6), (b)(7)c
4. IN-AIR HOTSEAT AUTHORIZED
5. O LOG 3011X FOR AND PRIOR TO FLIGHT

**POC**

- (b)(3), (b)(7)c

---

**ENVELOPE**

**FIELD HOURS:** 24 hrs

**QUIET HOURS:** None

**BMNT/SR:** 0507/0704

**SS/SEENT:** 1726/1923

**MR/MS:** 0743/2147

**ILLUM:** 7%

**LIT:** 1955-0435* **HLL:** 0439-0507, 1923-1955
UNITED STATES MARINE CORPS
MARINE MEDIUM TILTROTOR SQUADRON 261 (-) REINFORCED, COLD RESPONSE DETACHMENT
MARINE AIRCRAFT GROUP 26, 2D MARINE AIRCRAFT WING, FMF
POSTAL SERVICE CENTER BOX 21016
JACKSONVILLE, NC 28545-1016

MISSION: SUPPORT THE MAGTF COMMANDER BY PROVIDING ASSAULT SUPPORT TRANSPORT OF COMBAT TROOPS, SUPPLIES AND EQUIPMENT, DAY OR NIGHT, UNDER ALL WEATHER CONDITIONS DURING EXPEDITIONARY, JOINT, OR COMBINED OPERATIONS.

FLIGHT SCHEDULE THURSDAY, 17 MARCH 2022 (2076)

<table>
<thead>
<tr>
<th>EVENT</th>
<th>TMR</th>
<th>BRF</th>
<th>ETD</th>
<th>ETR</th>
<th>HRS</th>
<th>AIRCREW</th>
<th>TRAINING CODES</th>
<th>MISSION</th>
<th>NOTES</th>
<th>CONFIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHOST 3-0 MV-22B</td>
<td>2K2</td>
<td>0930</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>2242, 2280, 2281, 2282, 2641, 6240</td>
<td>FCF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GHOST 3-1 MV-22B</td>
<td>1A1</td>
<td>1200</td>
<td>1500</td>
<td>1815</td>
<td>3.3</td>
<td>CPL MOORE, J.</td>
<td>2242, 2280P, 2281P, 2282R, 22841</td>
<td>SEC LAT / CALS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GHOST 3-2 MV-22B</td>
<td>1A1</td>
<td>1200</td>
<td>1500</td>
<td>1815</td>
<td>3.3</td>
<td>CAPT TONKIEWICZ, M.</td>
<td>2242, 2280, 2281, 2282, 2641</td>
<td>SEC LAT / CALS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GHOST 3-3 MV-22B</td>
<td>215</td>
<td>1645</td>
<td>1945</td>
<td>0000</td>
<td>4.3</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>2280, 2281, 2282, 2341, 23441, 3340, 6240</td>
<td>NS TAAR / TRAP</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MV-22B</td>
<td>1A9</td>
<td>1645</td>
<td>1945</td>
<td>0000</td>
<td>4.3</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>2280, 2281, 2282, 2341, 23441, 3340, 3340X</td>
<td>NS TAAR / TRAP</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

@ AIR MISSION COMMANDER / # FLIGHT LEAD / ** DIVISION LEAD / ** SECTION LEAD / X ATV REQUIRED / R NOT PROFICIENT / P PROFICIENCY EXPRESSES W/I 90 DAYS
** UNLESS OTHERWISE INDICATED, ALL FLIGHTS WILL ORIGINATE AND TERMINATE AT bomber AIR BASE (ENBO) **

FLIGHT NOTES:
1. TO FLY LAT ROUTE A AND B.
2. DS22 RESERVED FOR NS TAAR WITH VMGR-252.

ADMIN NOTES:

<table>
<thead>
<tr>
<th>START</th>
<th>END</th>
<th>LOCATION</th>
<th>REMARKS</th>
<th>POC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0630</td>
<td>TBD</td>
<td>CHOW HALL</td>
<td>NARVIK PORT POSS</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
</tr>
<tr>
<td>0830</td>
<td>1030</td>
<td>OPS 5</td>
<td>MAINTENANCE MEETING</td>
<td>ALL DESIGNATED PERSONNEL TO ATTEND</td>
</tr>
<tr>
<td>1000</td>
<td>1030</td>
<td>CAVES</td>
<td>INTEL BRIEF</td>
<td>S-2 PERSONNEL TO ATTEND</td>
</tr>
<tr>
<td>1100</td>
<td>1200</td>
<td>CAVES</td>
<td>RETROGRADE MEETING</td>
<td>ALL DESIGNATED PERSONNEL TO ATTEND</td>
</tr>
<tr>
<td>1330</td>
<td>1400</td>
<td>MS TEAMS</td>
<td>APB</td>
<td>ASRS FOR FOLLOWING DAYS VERIFICATION</td>
</tr>
<tr>
<td>1500</td>
<td>1600</td>
<td>OPS NORTH</td>
<td>SAFETY MEETING</td>
<td>AUTHORITY</td>
</tr>
<tr>
<td>NLT</td>
<td>1500</td>
<td>INDIVIDUAL SPACES</td>
<td>STREP INPUTS DUE TO S-3</td>
<td>ALL SHOPS TO SUBMIT</td>
</tr>
<tr>
<td>NLT</td>
<td>1600</td>
<td>OPS 5</td>
<td>STREP DUE TO MAW G-3</td>
<td>S-3 TO SUBMIT</td>
</tr>
<tr>
<td>NLT</td>
<td>1600</td>
<td>OPS 5</td>
<td>ATO INPUTS DUE TO MAW G-3</td>
<td>OPS CLERKS TO SEND TO (b)(3), (b)(6), (b)(7)c</td>
</tr>
<tr>
<td>1900</td>
<td>1930</td>
<td>OPS 5</td>
<td>MAINTENANCE MEETING</td>
<td>ALL DESIGNATED PERSONNEL TO ATTEND</td>
</tr>
</tbody>
</table>

OPS: /S/  
DSSN: /S/  
MAINT: /S/
ALS / SEC LAT / CAL

GHOST 3-1 Flight
31Y/94Y
TAC 1(Btn 21S): 280.275
17 March 2022

ORIENTATION
Area of Operation
EXECUTION
Coordinating Instructions

- **Mission-Essential Equipment**
  - Aircraft: DTED
  - Personal: Food/Water for 3.3 hrs of flight
- **GO**
  - 1 x MV-22
- **No-Go**
  - 500/1
- **Aborts - SOP**
- **Wave Offs (C1)**
  - Single – Use C/S, maint lane, turn DW land w/ visual
  - Flight – Use flight C/S, maint lane, A/C furthest upwind priority to turn, land w/ visual
EXECUTION
Coordinating Instructions

- Emergency/System Failures
- IIMC
  - Bodo Reversal
  - Wx < 1000' AGL / degraded visibility below terrain = CONV mode
  - Loss of 3 ground references = "Knock it off"
- Loss of Visual Contact
  - Over water: ASTAC SOP
  - In Terrain: talk-on → Bodo reversal
- Terminate / Knock-it-off
- Downed AC
  - Internal / External

ADMIN AND LOGISTICS

- Bump Plan:
  - 3-2 takes good A/C with Capt Brao
- Delay/Straggle Plan/Drop Dead
  - Delay: 15 mins for section; Good A/C takes Ghost 3-1 call sign and pax
  - Straggle:
    - Straggle A/C Stay local for CALs
    - Stay up TAC-1
    - Rejoin on deck in Shrike
  - Drop Dead
    - 1645L: PAX movement
    - 1715L (training)
ADMIN AND LOGISTICS

• Fuel Plan / Fuel required
  - T/O: 10.5
  - Mission: 10.5
  - Joker: 4.5
  - Bingo: 3.7 (Arty - ENBO)
  - Available: ENBO/ENDU
  - BINGO NO FLPN: ENBO/2200#/4500'/200KTS
• LOS/Bullseye: ENBO/ENEV/ENDU
• Ordnance: TNG/SEMI/PROG-1
• Debrief Location/Time

COMMAND AND SIGNAL

• Chain of Responsibility
  - Authority to change route, LZs – SL
  - Extension/Schedule change: SOP
• Frequencies
  - Assigned calls:
    • LD = ATC, COMM3
    • -2 = WX, BASE, AIRSPACE COORD
• Lost Comm / Single Radio Plan
  - ASTACSOOP Day Method 2
  - Maintain Ch2, Good Comm A/C assume Ch1 calls
• Chattermark = 21S – 20 – 1
• Golden = 1
• IFF Procedures/Codes
  - 3-1 carries squawk
• Risk to Forces
  - Blue: Poor weather calls with confining terrain and icing.
    - WX < 5000'/5sm at coastal airports = No Inland LAT
    - WX < 1000'/3sm = Conversion Mode
    - WX < 500' / 1sm = No Go
  - Red: Terrain / Icing / Turbulence

• Risk to Mission
  - Blue: Getting behind fuel ladder due to CONV mode Ops.
  - Red: WX
Hey, all!

Some information, please read all and distribute to all pilots!

We realize at Lion Ops that certain things that have been briefed and informed via e-mails and Signal messages haven't come across to everyone. Please make sure your squadron has a way of letting ALL pilots in on the info routed from us to you.

- Low Level
  - We have finally gotten a standing approval for TWO low level routes down to an altitude of 500'.
  - They are attached and are NOT the same ones you received earlier. Please shred the previous route and plan for this one any time you want to go flying lower than 1000'.
  - For ATO requests, requesting "Low level route Alpha" should be sufficient for NAOC to know. Any time you go off this route, please climb back to 1000'.
  - AGAIN: You still have to plan these routes properly with regards to towers, power lines, etc. They are not recently chummed.

- IFG
  - You have all received this. The presets on the front page are possible (and encouraged) to use by tower here in Bodo. They prefer UHF frequencies for ground, tower, departure/approach and arrival. VHF only for Polaris (Preset 8 and 9.)
  - "Lion 69, push Departure channel 6." Etc.
  - This is just a recommendation, ATC is aware that this might not be the standard for you all.

- FARP
  - You HAVE to contact tower to operate on Yankee.
  - Today there was an incident (again) where Tower suddenly realized that FARPing(?) was going on, but the pilots had not informed Tower that this would take place.
Bodo TWR now wants you to ALWAYS file a VFR flight plan, this is due to some sort of system limitations.

Apparently it is 6-9 times easier for them to accommodate you when the FPL has “VFR” in it compared to when it says “IFR.”

When you contact tower, this is where you state your actual request. (“Vokky VFR 1000” or “XXXX IFR departure.”)

In the remarks/free text of your FPL, this is where you will put WHERE you're going, or what area, and also the remark “CR22”.

Thanks guys.

ARC

Royal Norwegian Air Force
<table>
<thead>
<tr>
<th>Flightplan Id's</th>
<th>Aircraft Id</th>
<th>Flight Rules</th>
<th>Type of Flight</th>
</tr>
</thead>
<tbody>
<tr>
<td>458995 - 0 -</td>
<td>GHOST31</td>
<td>V: VFR</td>
<td>M: Military</td>
</tr>
<tr>
<td>Number of Aircraft(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment (NAV/COM)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDITUY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of Flight (ymmd)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220318</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADEP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENBO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENBO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Route, Visualize Route:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCT VOKKY DCT TUVLA DCT GIRUX DCT UNSOR DCT EVANI DCT KEGAX DCT DITEB DCT MOVAB DCT DITEB DCT GIBMO DCT ELDUR DCT UBABA DCT ARDUX DCT VOKKY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMK/SSR A1631 OAT IN CR22 AREA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Supplementary Information

<table>
<thead>
<tr>
<th>Endurance (HHMM)</th>
<th>Persons on board</th>
<th>Emergency Radio</th>
<th>Survival Equipment</th>
<th>Jackets</th>
<th>Dinghies</th>
<th>Aircraft Colour and Markings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0330</td>
<td>4</td>
<td>UHF VHF</td>
<td></td>
<td>Light</td>
<td>1</td>
<td>GREY</td>
</tr>
</tbody>
</table>

Information on Survival Equipment
- Polar
- Desert
- Maritime

Information on Jackets
- Light
- Fluores
- UHF VHF

Information on Dinghies
- Capacity
- Cover
- Colour
- YELLOW
Aircraft Id: GHOST31

Flight Rules:
- V: VFR

Type of Aircraft:
- V22

Wake Turbulence Category:
- M: Medium

Type of Flight:
- M: Military

Date of Flight (ymmdd):
- 220318

EOBT (UTC-time):
- 1345

Total EET (HHMM):
- 0315

Cruising Speed:
- N: 0200

Cruising Level:
- A: 015

Endurance (HHMM):
- 0330

Persons on board:
- 4

Emergency Radio:
- VHF
- UHF

Survival Equipment:
- Yes
- Polar

Jackets:
- Yes
- Light

Jackets:
- Yes
- Desert

Jackets:
- Yes
- UHF

Survival Equipment:
- Yes
- Maritime

Jackets:
- Yes
- Fluores

Dinghies:
- 1
- 28

Dinghies:
- Cover
- Colour: YELLOW

Aircraft Colour and Markings:
- Grey
JAGMAN LAT Flight Reconstruction
17 March 22

• Depiction created from MA recovered KVADR data for flight that occurred day prior to mishap
• Created by JAGMAN team to validate squadron flying tendencies through terrain IVO mishap location
• Low-level profile flown IAW TTPs and commensurate with terrain
JAGMAN Mishap Flight Reconstruction
18 March 22

- Depiction created from MC Mission Binder in VMM-261 JMPS Server
  - Original planned mission route was updated with mishap location during squadron post-mishap actions, this checkpoint has been removed.
- Checkpoints along reconstruction route were obtained from Norwegian ATC track and MA KVADR Data
- Low-level profile flown IAW TTPs and commensurate with terrain
GT31 JAGMAN Route Reconstruction
18 March 2022

TP 2-14 Obtained from Norwegian ATC tracking
TP 15-33 Obtained from MA KVADR Data
TP 34 Extrapolated based on last known airspeed and impact location

Enclosure (3o)

GT31 Planned Route
GT31 Extrapolated Route
COM NAOC Safety Brief

Flying in Norway

Current as of 01 June 2021

References

- Military Air Regulations 12 May 2017
- Air Operational Procedures (AOP): 09 Jun 2017
- Aeronautical Information Publication (AIP) www.ippc.no
- Agreement on Use of AMC Manageable Areas: 28 Jan 2021
Scope

- Flightplans / NOTAM / Met
- Civilian regulations / Air space
- Military Regulations / FUA
- Low Level flying in general
- Aircraft specific operations
  - Fighter aircraft
  - Fixed wing/transport
  - Maritime aircraft / MPA
  - Helicopters
  - Maritime helicopters
- Maps
- Phone numbers
- Main takeaways

Flightplans/NOTAM/MET

- Flightplans
  - File 1 hr prior to T/O
  - Call Norway AIS briefing office
    - +47 6481 9000/+47 6481 9015
      or ippc.no
- ATO Feeder/airpace request to NAOC
  - NLT 0900L the day prior (on Friday if flying Monday)
- NOTAM
  - ippc.no
- MET
  - ippc.no (METAR/TAF)
  - MWO: Oslo 22963000, Bergen
    55236650, Tromsø 77621300
General Information

- AIP: [www.ippc.no](http://www.ippc.no) (AIS publications)
- PPR
  - Check AIP for requirements
- Opening hours
  - Refer to AIP Norway and NOTAM
- Fuel
  - Normally available inside opening hours (some AFIS fields do not have fuel)

Civilian regulations

- Civilian airspace regulations are in accordance with SERA (Standardized European Rules of the Air), and additions depicted in BSL-F
  - [www.caa.no](http://www.caa.no)
- Aeronautical Information Package Norway (AIP Norway)
  - [www.ippc.no](http://www.ippc.no)
**Civilian Airspace Structure (AIP Norway ENR 1.4)**

- In Norway there are 4 classifications of airspace, A, C, D and G which comply with ICAO standards
  - 1) TIA and TIZ, and CTR outside opening hrs, are classified as RMZ (Radio Mandatory Zone)
  - 2) Some exceptions

**Communication**

- All clearances shall be read back as given by ATC
  - (Do not use copy/wilco/roger)

- Radio Mandatory Zones (RMZ)
  - Closed CTR and AFIS airports (TIZ/TIA) are G airspace and defined as RMZ.
  - **Before** entering and manoeuvring within you shall transmit on respective CTR/AFIS frequency stating your callsign and intentions.
**Offshore CTAs and ADSs**

- **CTA**
  - Class D Airspace
  - 1500’ AMSL – FL085

- **ADS**
  - Class G Airspace
  - GND – 1500’ AMSL

- Contact Norway ACC «Polaris Control» for traffic information or clearance

- AIP ENR 2.1 + 2.2

**Offshore Helicopter routes**

- **Normally:**
  - Remain within 4 NM of route
  - 2000’ out
  - 3000’ in
  - May be lower in case of icing.

- Remain in contact with «Polaris Control»

- AIP ENR 2.2
**Offshore Helicopter routes**

---

**Helicopter Traffic Zone (HTZ)**

- Established at all permanent offshore installations with a landing pad.
- 5NM radius
- 2000' AMSL
- RMZ
- Usually «Polaris Control»
- Positions and frequencies: AIP ENR 2.2
Safety Zones

- Offshore facilities have a 500 meter safety zone above and around.

- Unauthorized activities within the zone is forbidden.

- Refer to AIP ENR 2.2

QNH SETTING AREAS

- QNH Settings and regions:
  
  - For air traffic operating on the Norwegian continental shelf, QNH setting areas are established. When flying in these areas altimeter setting is based on observed local QNH from a METAR station area.

  - ATS will state the QNH for the areas via R/T. When crossing a border between QNH areas, the altimeter setting shall be changed when informed by ATS.
Airspace Structure

- There is no military control outside Military Training Areas / Flexible Use of Airspace (FUA) like in other parts of Europe. We do not have military close control.
- Flying VFR, you will vertically and laterally pass numerous different zones, areas and classes of airspace.
- Clearance is mandatory if you intend to enter controlled airspace.
- Aircraft will avoid flying into uncontrolled TIZ/TIA space. Two way prior comms is mandatory if you have to enter.
- It is the pilot's responsibility to adhere to the airspace structure!
- We've had numerous near misses and airspace violations involving foreign aircraft the last years, and that is as always not acceptable!
- VFR flight gives you a lot of freedom, but also a lot of responsibility!
Military regulations

- BML
  - Regulations for military aircraft
  - No English version

Flexible use of airspace (FUA)

- Agreement effective as of 12. November 2015
  - Separates Mil/civ traffic
  - Typical: FL 660
  - Unspecified
- Lower limit typically corresponds to lower limit of controlled airspace
- When G airspace below, expect to be cleared area from Ground and up to requested altitude
- Area entry:
  - Prior to entering FUA airspace, contact TAC C2
    (usually ATC hands you over)
- Area exit:
  - Advice TAC C2 about 5-10 min before leaving FUA airspace with intentions for RTB (IFR of VFR and altitude)
- Do NOT leave FUA airspace without a clearance from TAC C2
- CRC is always available on NATO COMMON
Geographic restrictions

- Flying EAST of 24 Degrees:
  - Approval COM NAOC
  - Requests, routes, timings
  - Nāv-log post flight
  - Flight-following mandatory (fighter A/C)

- Flying EAST of 28 Degrees East:
  - Not authorized for Fighter a/c

- Border distance SWE / FIN / RUS:
  - 10 NM (5 NM along approved low level routes/Training ranges/Departure-Approach)

Temperature correction

- MSAA corrections to low temp's (ICAO doc 8168):

Table H1-1-1 h). Values to be added by the pilot to minimum promulgated height/altitudes (ft)

<table>
<thead>
<tr>
<th>Aerodrome temperature (°C)</th>
<th>Height above the elevation of the altimeter setting source (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200</td>
</tr>
<tr>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>-10</td>
<td>20</td>
</tr>
<tr>
<td>-20</td>
<td>30</td>
</tr>
<tr>
<td>-30</td>
<td>40</td>
</tr>
<tr>
<td>-40</td>
<td>50</td>
</tr>
<tr>
<td>-50</td>
<td>60</td>
</tr>
</tbody>
</table>
Wind correction

- MSAA corrections to strong winds:
  - Guideline tool from ICAO doc 8168:
    - "It is up to the pilot-in-command to evaluate whether the combination of terrain, wind strength and direction are such as to make a correction for wind necessary."

<table>
<thead>
<tr>
<th>Wind speed (kt)</th>
<th>Altimeter error (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>53</td>
</tr>
<tr>
<td>40</td>
<td>201</td>
</tr>
<tr>
<td>60</td>
<td>455</td>
</tr>
<tr>
<td>80</td>
<td>812</td>
</tr>
</tbody>
</table>

Low Level Flying (<1000ft AGL)

- NAOC is the approval authority for all low-level flying to ensure deconfliction from other military and known civilian traffic, noise-sensitive areas, fur farms, powerlines etc.
  - Normally, such approval will only be given when aircrew are departing from a Norwegian airfield or airbase.
- In certain conditions (e.g. during exercises), NAOC may approve low level flying in Norway for aircrew departing from abroad.
- Can be delegated to an experienced RNORAF pilot during exercises or other activities.
- Mandatory face to face or VTC brief required (telephone conference can be used if no other option available. Needs to be approved by NAOC)
Aborted low level flying

- If you have to abort low level flying, and this results in flying into IMC without prior coordination with ATC, the following applies when inside controlled airspace:
  - Climb above minimum safe altitude and level off at the lowest flight level that ends with 5 (FL35, FL45, FL55 etc.) or a higher altitude with 5 if an emergency situation so requires.
  - Inform appropriate controlling agency (ATC/CRC (Fighter Controller)) ASAP. Obtain an IFR clearance as soon as practical.
  - If unable to contact controlling agency (ATC/CRC), Squawk mode 3, code 7600 or 7700 if an emergency situation exists.

- If an emergency situation exists, regardless of position:
  - Climb to a safe altitude.
  - Squawk IFF Mode 3, code 7700.
  - Broadcast MAYDAY message on VHF or UHF Guard frequency.

Deviating from Preplanned Low-Level Track

- When forced to deviate from the pre-planned track due to poor weather conditions or other reasons, low-level flying will be discontinued.
- Low-level flying may be continued if and when the aircraft or formation is able to get back on the planned track.

Minimum safe altitude

- When planning the low level route:
  - A minimum safe abort altitude (MSAA) shall be determined and clearly depicted on the map for each leg or section of the route.
  - The MSAA is calculated based on the highest obstacle within 5NM on either side of planned track.
  - MSAA shall ensure 2000' terrain separation if the highest obstacle is above 6000' MSL, otherwise 1000' terrain separation.
  - These MSAA's shall be corrected for low temperature conditions and strong winds.
Violations of low level flying regulations

- All violations of regulations regarding minimum altitudes are to be reported to Host Unit (HU) Air Wing Commander and COM NAOC as soon as possible.
- HU Air Wing Commanders are given disciplinary authority on behalf of COM NAOC.

Airspace for low level flying

- Norway has no dedicated low level airspace or corridors.
- The whole country and open waters is available for low level as long as minimum heights above the following areas are adhered to:
  - Cities, and smaller, densely populated areas
  - National parks
  - Fox/mink farms
  - Protected areas

  - Low flying over "open waters" means flying outside the Norwegian coast line, and more than 1 NM from islands and peninsulas.
FIXED WING SECTION

Minimum altitudes – Foreign mil A/C

- As a general rule, aircraft will not fly lower than 1000' AGL, except during take-off and landing.

- The minimum altitude over cities and villages for Fighter a/c is 3000' AGL.

- Low flying (below 1000') requires NAOC approval.

- 500' AGL min ALT may be approved as a general minimum altitude for an approved low level route, inside a defined exercise area or inside a gunnery range.
  - Such approval may be granted on a mission to mission basis, or for a specific range of missions.

- 300' AGL min ALT may be approved inside a defined exercise area when participating in a planned exercise or other activity approved by COM NAOC. If a defined exercise area is not specified, or parts of the flight will occur outside the specified exercise area, 300' min ALT may still be approved inside a further specified area.
  - Such approval may be granted on a mission to mission basis, or for a specific range of missions.
Minimum altitudes –
Fighter A/C

- For Fighter A/C, 200' AGL min ALT may be approved provided the mission is conducted as a formation flight led by a Norwegian pilot.
- Prerequisites for flying 200' AGL in Norway is that the low level route has been flown and recognized at 300'-500' AGL within the last 12 months.
  - Reason: Towers and power lines are often erected without being reported to appropriate authorities, and without corresponding map updates.

Minimum altitudes MPA &
Transport A/C

- Foreign MPA and Transport A/C flying in IMC may fly down to 200ft AGL min ALT over the water provided the A/C is equipped with radar altimeter, operational navigation equipment, the mission requires it and the A/C is 5NM or more from shore over open water.
**Fur animal vulnerability seasons**

- **Fighter A/C**
  - **Red:** 15 March - 25 June
  - **Yellow:** 1 March - 14 March & 26 June - 10 July
  - **Green:** 11 July - 28 (29) February

  **Overall fur animal season is 1 March - 10 July**

  **Red:** Low level training with fighter aircraft is to be avoided.
  - Fighters are to stay 3000 AGL / 3.0nm away from known fur farms.
  - A/C exercises with continuous noise is not allowed below 8000'AGL within 10nm of known fur farms.

  **Yellow:** Fighters are to stay 3000 AGL / 0.5nm away from known fur farms.

  **Green:** No restrictions.

  SAR & medevac missions are exempt when needed.

- **Multi Engine & Small A/C**
  - **Red:** 15 March - 25 June
  - **Yellow:** 1 March - 14 March & 26 June - 10 July
  - **Green:** 11 July - 28 (29) February

  **Overall fur animal season is 1 March - 10 July**

  **General:** Exercise caution using high engine power when close to fur farms.

  **Red:** Low level training with multi engine and small size A/C is to be avoided.
  - Multi Engine and smaller size A/C are to stay 2000'AGL / 2.0nm away from known fur farms.

  **Yellow:** Multi Engine and smaller size A/C are to stay 2000'AGL / 0.5nm away from known fur farms.

  **Green:** No restrictions.

  SAR & medevac missions are exempt when needed.
Reindeer

- Reindeer may be sensitive to noise from aircraft. Great caution is required to avoid overflying herds of reindeer at low altitudes. If possible, stay clear of reindeer-flocks when flying low level.
- The following periods require increased attention to avoid areas with reindeer:
  15. April – 15. June and

Bird congested areas

- AIP-Norway ENR 5.6 describes the most important bird congested areas, and the most common migration routes during spring and autumn.
- Consult AIP Norge ENR 5.6 for recommended minimum altitudes for flying over bird congested areas and migration routes.
- Associated maps are no longer found in AIP-Norway. Bird congested areas are however marked on LFC Norway 1:500000 charts.
Norwegian national holidays

- Low flying is not permitted on the following national holy days:
  - 1. January,
  - Maundy Thursday,
  - Good Friday,
  - Easter Eve,
  - Easter Sunday and Easter Monday,
  - 1. May, 17. May,
  - Ascension Day,
  - Whit Sunday and Whit Monday

- The same restriction applies after 13:00 local time on 24. and 31. December; and Pentecost Eve.

Flying at Supersonic speed

- Over land:
  - Above FL300 only

- Over open Water:
  - Minimum FL150 provided:
    - A/C is more than 10NM from land, pointing away from coastline.
    - A/C is more than 30NM from land.
    - If above conditions cannot be satisfied, use minimum altitude FL300.
Chaff & Flares

Release of Chaff:
- Use of "Bulk Chaff" is to be coordinated with COM NAOC.
  - Take upper winds into consideration.
- Use of "Self Protection Chaff" within Air Traffic Control Zone and TMA is to be coordinated with ATC.
  - No restrictions inside Military Training Areas (TSA / FIA).

Release of Flares:
- No use of flares below 3000 feet AGL over land.
- Over open water; no altitude limit, but stay clear of vessels.
- No use of flares above populated areas.
- No use of flares at night unless approved by COM NAOC.
- When releasing flares make sure that adversary is:
  - Above or at same altitude
  - On lead pursuit curve, or
  - On pure pursuit curve

ROYAL NORWEGIAN AIR FORCE
Norwegian Air Operations Centre

ROTARY WING SECTION

ROYAL NORWEGIAN AIR FORCE
Norwegian Air Operations Centre

ENCLOSURE
**Helicopter specifics – Low Level Flying**

- Minimum altitude for foreign crews is 1000' AGL. (Lower altitudes must be approved by COM NAOC and require a face to face VFR briefing).
- Low level flying is defined below 500' AGL.
- Tactical flying below 200' AGL, only in areas well known to the crew. Mission will be briefed with special attention to power lines and other low level hazards.
- For tactical terrain following flying, minimum altitude is 50' AGL.
- Minimum altitude in populated areas (cities) is 1000' AGL.
- Minimum altitude over protected areas is 1000' AGL.

**Minimum altitudes maritime helicopter**

- Foreign maritime helicopters flying in IMC may fly down to 200' AGL min ALT over the water provided the a/c is equipped with radar altimeter, operational navigation equipment, the mission requires it and the helicopter is over open water 800 meters (2400') or more from shore/installations.
Fur animal vulnerability seasons
- helicopters

- Red: 15 March – 25 June
- Yellow: 1 March – 14 March & 26 June – 10 July
- Green: 11 July – 28 (29) February

Overall fur animal season is 1 March – 10 July

Red & Yellow: Helicopters are to stay
1000'AGL / 0.5nm away from
known fur farms.

Green: No restrictions

SAR & medevac missions are exempt when needed.
Reindeer

- Reindeer may be sensitive to noise from aircraft. Great caution is required to avoid overflying herds of reindeer at low altitudes. If possible, stay clear of reindeer-flocks when flying low level.
- The following periods require increased attention to avoid areas with reindeer:

Bird congested areas

- AIP-Norway ENR 5.6 describes the most important bird congested areas, and the most common migration routes during spring and autumn.
- Consult AIP Norge ENR 5.6 for recommended minimum altitudes for flying over bird congested areas and migration routes.
- Associated maps are no longer found in AIP-Norway. Bird congested areas are however marked on LFC Norway 1:500000 charts.
**Norwegian national holidays**

- Low flying is not permitted on the following national holy days:
  - 1. January,
  - Maundy Thursday,
  - Good Friday,
  - Easter Eve,
  - Easter Sunday and Easter Monday,
  - 1. May, 17. May,
  - Ascension Day,
  - Whit Sunday and Whit Monday

- The same restriction applies after 13:00 local time on 24. and 31. December, and Pentecost Eve.

---

**Helicopter specifics – Landing outside airfield**

- Landing on cultivated areas (Farmland) requires permission from the owner.
- Landing within military establishment without permanent landing area is subject to permission from the commander of the establishment.
- Landing inside densely populated area is subject to permission by the local police and by the owner or user of the area.

<table>
<thead>
<tr>
<th></th>
<th>Cultivated Ground</th>
<th>Uncultivated Ground</th>
<th>National Park etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAR/Police/etc</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Mil ops</td>
<td>NO (Owner)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Exercise</td>
<td>YES (Owner)</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
Helicopter specifics – VFR operations

- Flying under bridges, power lines or any other installation is prohibited.
- VFR Flight visibility below 1000' AGL
  - Day: 0.8 km (civilian rules)
  - Night: 5 km visibility with distinctive terrain contours (military rules)
  - Night with NVG: 3 km visibility with distinctive terrain contours. Cloud base min 300' AGL (military rules)
- Special VFR (inside a control zone)
  - Min 800 m visibility
  - Clear of cloud and surface in sight

Helicopter specifics – NVG operations

- If you are
  - outside controlled airspace and
  - below 500 ft AGL and
  - NVG ops are reported on flightplan

Then conventional exterior lights may be switched off
(IR lights should be on)
[END OF ROTARY WING SECTION]
Map requirements/availability

- The Norwegian mil GEOMETOC services have several types of maps available:
  - *M517-AIR (1:250K)
  - *LFC (1:500K)
  - FLMA (1:1M)
  - N100-AIR (1:100K)
  - N50-AIR (1:50K)

- All maps are available in the following formats:
  - POD (Print-On-Demand) (M517, LFC, FLMA only)
  - GeoTIFF 169dpi
  - GeoTIFF 400dpi
  - Geopackage
  - MbTiles (For use in desktop app MapTiler and iOS app Foreflight)

* Maps to be used as reference to protected areas and areas prohibited for low flying.

Map requirements/availability cont'd

- Updates to the maps are issued according to AIRAC releases by Avinor (NOR CAA), approximately once a month.
  - This will enable aircrew to identify areas were low flying is prohibited.

- Your host base will be responsible for printing updated maps.
  - Downloads will be made available on request, but aware of file size in relation to your available bandwidth.

- If possible, obtain current maps through your own GEOMETOC organization
Map legend – vertical obstacle depiction

- Single < 100 feet
- Single < 100 feet - lit
- Multiple < 100 feet
- Multiple < 100 feet - lit
- Single 100 feet or higher
- Single 100 feet or higher - lit
- Multiple 100 feet or higher
- Multiple 100 feet or higher - lit

Map legend – Powerlines/spans

- Powerline
- Powerspan/bridge

Direction (relative to geographical north) = Obstacle height (feet)

Feet: "Clock method”
1 hour = 100 feet
Map legend – Danger- and restricted areas

- Permanent Danger areas
  - Activity dangerous for aircraft may take place. Recommend to coordinate activity with NAOC before entry.

- Temporary Danger areas
  - Activity dangerous for aircraft may take place. NOTAM activated.

- NOR NAVY firing area (SDP103(G))
  - Same marking as temporary danger areas. Identification will correspond with region. E.g. Eastern parts of Norway Ø10, Ø11, etc.

- Restricted areas
  - Same marking as Danger areas. Identification «EN Rxxx» in stead of «EN Dxxx». To be avoided unless authorized by approval authority.
Map legend –
protected areas

- Protected area – restriction 1000 feet
  - Protected area 1.MAY-31.jul
  - NOR A/C allowed below 1000ft outside these dates
  - Foreign A/C: 1000ft restriction all year

- Protected area – restriction NO LDG
  - Protected area NO LDG
  - Applies all year unless otherwise depicted

Map legend –
airspace

TMA  TIA  CTA
HAZARDS

- The Ground
- Wires and towers
- Aircraft and helicopters
- Gliders and paragliders
- Unmanned Vehicles (UAV's)
- Birds
- Low sun
- White out (featureless terrain)
- Wind
The Ground

- Keep your priorities straight regarding your maneuvers and flight versus the proximity to the ground and the terrain surrounding you.

- If you have to look away, ensure deconfliction with ground for the duration. Quick cross-checks are paramount.

- GCAS systems may save you, but you have to act quickly.

- **IF YOU ARE NOT 100% SURE YOU ARE IN THE RIGHT FJORD OR VALLEY**
  - CLIMB OR TURN AROUND!

Wires and Towers

- Most towers are under 200 feet AGL. (mobile phone towers).

- Short wire spans are as deadly as long spans.
Power lines

• How easy is it to see wires if you don't know where they are.....?

This is what you see...

• But this is what you get...
Power lines

- How about this one?

- NOVIK, 20 NM south of Bodø

Power lines

- Be aware of this variant!
Wires

- Techniques on avoiding wires.
- Techniques on finding wires.

Aircraft and Helicopters

- Where?
- How to reduce risk?
- TCAS
Flying Hazards; Other Aircraft

• On-shore Civ VFR may fly without flightplan and talk to Nobody.
  - Refer to IPPC/briefing/Statnett for info about Powerline building operations (Typical 500 AGL slingload).
• Fly on the right side in the walleys to prevent head-on collisions with Other VFR traffic.

• Offshore helicopter traffic in/over the exercise area.
  - In ADS (G airspace).
    • Requested to communicate position & intentions with ATC.
  - In D or C airspace:
    • Always obtain ATC clearance first.

Dense civil helicopter operations

• Typical
  - GND – 500ft AGL
  - Slingload
  - No flightplan
  - No comms with ATC in G airspace
Areal sporting activity

- Where?
- How to avoid?

UAVs

- Where?
- How to avoid?
**Birds**

- Birds are normally not a big problem during winter
- Eagles and falcons in mountains
- Largest concentration of birds along the coast.
  - Avoid overflying small islands and fishing boats

**Bird concentration areas**

- All year
- April to August
- September to March

Flying below 1600 feet above the surface may involve a risk
Low sun

- Planning consid's.
  - If avoidable: Don't plan low level flying «into» a low sun.

- Techniques.
  - Flight path deconfliction.

Winter

- Low sun - white snow-cover

- Expect winter conditions, even in summer...
Winter

- Visual height references:
  - No trees / small trees
  - Rocks – size

- Depth perception in dim light conditions:
- NVG flight in snow conditions

- Wx may change rapidly - CHECK LATEST

- METAR’s – keep updated. Plan for bad weather

Wind

- Severe turbulence - heavy downdrafts
• Snow/desert: Can be hard to judge altitude. The rock you assume to be 5 meters in diameter is only 1 meter, leading to a misperception of altitude.

• PGCAS can save you, but best to recognize hazard and avoid putting flight path marker into terrain.

• Water: «Glassy» water makes it hard to judge altitude. Use RALT to ease the a/c down.

The following subjects are Norwegian recommended emphasis items for low level authorization:

• Choice of routing, terrain, known hazards/obstacles (wires, towers), and fur farms.
• Danger areas and other airspace restrictions
• Weather and light conditions.
• Airspace structure and communication with ATC.
• Other air traffic below 3000 feet AGL.
• Weather aborts and minimum safe altitudes. Your position in relation to surrounding terrain and min safe altitude.
• Contingencies (uncertain about position, wingman blind etc.)
• Guidance and restrictions for (parts of) the planned route.
• Flight lead and flight members’ experience and low level currency.
Please....

Do not expect to be approved for low level unless it's a part of your squadrons mission sets!

There are few restrictions and regulations for Low Level flying in Norway.

Please acknowledge & adhere to the ones we have, then hopefully, we can keep things the way they are!

**MAIN TAKEAWAYS**

- **AIRSPACE**
  - Radio procedures
- **Low Level restrictions**
  - Mink Farms
  - Reindeer
  - Protected areas
    - 1000ft AGL
    - NO LAND/NO HOVER
- **Weather/season**
  - Fuel consids/alternates
- **NAOC ATO**
  - Inputs needed 0900L the day prior
    - Maps: forward to naoc@mil.no
    - DOTAhs: call A3-5 if not able
Reporting of safety related incidents

- All safety related incidents and occurrences shall be reported to the local Wing Safety Officer (WFSO) or directly to the Inspectorate of Flight Safety.

- In some cases incidents shall also be reported anonymously to the Norwegian Civil Aviation Authority (CAA) in accordance with EU Reg 376/2014 and 2015/1018 Annex I.

- The form NP-2007 shall be utilized for all incident reporting involving ATC and/or civil aircraft.

- Examples:
  - Runway incursions
  - Bird strikes
  - Anytime "mayday" is declared
  - ATC clearance violations
  - Training Area violations
  - Near miss
  - Illuminated by laser

Questions?
Useful phone numbers (civ/mil)

- **NAOC**
  - NDO: +47 7553 6900 / 0565-6900
  - A3-3 FICO: +47 7553 6931 / 0565-6931
  - A3-5 (ATO): +47 7553 xxxx / 0565-xxxx

- **Wing ops:**
  - ENBO
  - ENOL
  - ENDU
  - ENAN
  - ENGM
  - ENRY
UNITED STATES MARINE CORPS
MARINE MEDIUM TILTROTOR SQUADRON 261 (-) REINFORCED, COLD RESPONSE DETACHMENT
MARINE AIRCRAFT GROUP 26, 2D MARINE AIRCRAFT WING, FMF
POSTAL SERVICE CENTER BOX 21016
JACKSONVILLE, NC 28545-1016

MISSION: SUPPORT THE MAGTF COMMANDER BY PROVIDING ASSAULT SUPPORT TRANSPORT OF COMBAT TROOPS, SUPPLIES AND EQUIPMENT, DAY OR NIGHT, UNDER ALL WEATHER CONDITIONS DURING EXPEDITIONARY, JOINT, OR COMBINED OPERATIONS.

FLIGHT SCHEDULE MONDAY, 21 FEBRUARY 2022 (2052)

*NO FLIGHTS SCHEDULED*

<table>
<thead>
<tr>
<th>START</th>
<th>END</th>
<th>LOCATION</th>
<th>REMARKS</th>
<th>NOTES</th>
<th>POC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>0830</td>
<td>OPS S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td>1000</td>
<td>OPS NORTH</td>
<td>ORLACKS</td>
<td>WEAPONS TURN IN</td>
<td>ALL MAINBODY PERSONNEL</td>
</tr>
<tr>
<td>1100</td>
<td>1130</td>
<td>OPS S</td>
<td>STAFF SYNC / WEEKLY SYNC</td>
<td>ALL SHOPS TO SEND A REPRESENTATIVE</td>
<td></td>
</tr>
<tr>
<td>1130</td>
<td>1200</td>
<td>OPS S</td>
<td>OPS SYNC</td>
<td>OPS PERSONNEL TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>1530</td>
<td>OPS S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
</tbody>
</table>

FLIGHT SCHEDULE TUESDAY, 22 FEBRUARY 2022 (2053)

*NO FLIGHTS SCHEDULED*

<table>
<thead>
<tr>
<th>START</th>
<th>END</th>
<th>LOCATION</th>
<th>REMARKS</th>
<th>NOTES</th>
<th>POC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>0830</td>
<td>OP S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td>1000</td>
<td>OPS S</td>
<td>INTRO TO WINTER SERVICE TRAINING</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>1130</td>
<td>OPS S</td>
<td>COLD WEATHER INJURIES</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1130</td>
<td>1200</td>
<td>OPS S</td>
<td>COLD WEATHER NUTRITION</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>1500</td>
<td>OPS S</td>
<td>COLD WEATHER CLOTHING DEMO</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>1530</td>
<td>OPS S</td>
<td>COLD WEATHER LEADERSHIP</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>1600</td>
<td>OPS NORTH</td>
<td>2D MAW OPS SYNC</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>TO ATTEND</td>
</tr>
<tr>
<td>1500</td>
<td>1600</td>
<td>OPS S</td>
<td>SIBERIA TRAINING</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>1730</td>
<td>OPS S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
</tbody>
</table>

FLIGHT SCHEDULE WEDNESDAY, 23 FEBRUARY 2022 (2054)

*NO FLIGHTS SCHEDULED*

<table>
<thead>
<tr>
<th>START</th>
<th>END</th>
<th>LOCATION</th>
<th>REMARKS</th>
<th>NOTES</th>
<th>POC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>0830</td>
<td>OP S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td>1000</td>
<td>OPS S</td>
<td>INTRO TO BIVOUAC</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>1100</td>
<td>OPS S</td>
<td>AVALANCHE / SAFE ROUTING</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>1200</td>
<td>OPS S</td>
<td>COLD WEATHER WEAPONS EFFECTS</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1330</td>
<td>1430</td>
<td>OPS S</td>
<td>SURVIVAL GEAR PRACTICE</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>1530</td>
<td>OPS NORTH</td>
<td>2D MAW OPS SYNC</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>TO ATTEND</td>
</tr>
<tr>
<td>1700</td>
<td>1730</td>
<td>OPS S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>2000</td>
<td>FIELD</td>
<td>OVERNIGHT SURVIVAL GEAR PRACTICE</td>
<td>ALL AIRCREW TO ATTEND</td>
<td></td>
</tr>
</tbody>
</table>

FLIGHT SCHEDULE THURSDAY, 24 FEBRUARY 2022 (2055)

*NO FLIGHTS SCHEDULED*

<table>
<thead>
<tr>
<th>START</th>
<th>END</th>
<th>LOCATION</th>
<th>REMARKS</th>
<th>NOTES</th>
<th>POC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>0830</td>
<td>OP S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td>1000</td>
<td>OPS S</td>
<td>WEEKLY SYNC</td>
<td>ALL SHOPS TO SEND A REPRESENTATIVE</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>1600</td>
<td>OPS NORTH</td>
<td>2D MAW OPS SYNC</td>
<td>(b)(3), (b)(6), (b)(7)c</td>
<td>TO ATTEND</td>
</tr>
<tr>
<td>1700</td>
<td>1730</td>
<td>OPS S</td>
<td>MAINTENANCE MEETING</td>
<td>DESIGNED PERSONNEL</td>
<td></td>
</tr>
</tbody>
</table>

COMMANDING OFFICER

Enclosure (32)
Sir,

Sorry for the delayed response. I took a bit of leave and am getting caught up.

There was no roster for that training. See attached schedule for the brief occurring on the 21st. All pilots attended that were present to include the mishap crew members. Also, I've attached the briefs we received. Let me know if you have any questions.

Very Respectfully,

-----Original Message-----
From: (b)(3), (b)(6), (b)(7)c
Sent: Tuesday, May 24, 2022 11:51 AM
To: (b)(3), (b)(6), (b)(7)c
Cc: (b)(3), (b)(6), (b)(7)c
Subject: RE: Data Request

Thanks for following up on this. I don't think there was ever a definitive answer via email regarding the NAOC training.

If the answer is that there is not a physical record of all of the personnel from VMM-261 in Norway receiving the brief that is ok.

However, if the understanding is that all of the pilots, and specifically that any of the crew of GT31 did receive that brief, it would be helpful to have an email from you and each of the personnel in the CC line stating that and ideally when/where. A flight schedule with the brief as a ground event would be bonus material in that regard if you have it.

-----Original Message-----
From: (b)(3), (b)(6), (b)(7)c
Sent: Wednesday, May 18, 2022 7:11 AM
To: (b)(3), (b)(6), (b)(7)c
Subject: RE: Data Request

Sir,

I'll look to see if there was a roster if that is what you're referring to. I'll see what my team can figure out for you.

I'm not sure a document exists on who reached the site when, but I know my team did not reach the site until 24 March. A spec ops team which included Counter Intel, Navy Seals, and a PJ were on scene either that night or next day.

(b)(3), (b)(6), (b)(7)c

See if there is any document pertaining to the NAOC safety brief. If we don't have it, maybe ARC can help locate it.

Very Respectfully,

(b)(3), (b)(6), (b)(7)c

---Original Message---

From: (b)(3), (b)(6), (b)(7)c
Sent: Friday, May 13, 2022 11:21 AM
To: (b)(3), (b)(6), (b)(7)c
Subject: Data Request

(b)(3), (b)(6), (b)(7)c

Is it possible to obtain a couple of products from your team if you have it?

Copy of NAOC Safety Brief Attendance for mishap crew members

Reference document of when and who first reached the mishap site

Thank you,

V/R,

(b)(3), (b)(6), (b)(7)c

Enclosure (32)
Sir,

Sorry for the delayed response. I took a bit of leave and am getting caught up.

There was no roster for that training. See attached schedule for the brief occurring on the 21st. All pilots attended that were present to include the mishap crew members. Also, I’ve attached the briefs we received. Let me know if you have any questions.

Very Respectfully,

---Original Message---

From: [redacted] (b)(3), (b)(6), (b)(7)c
Sent: Tuesday, May 24, 2022 11:51 AM
To: [redacted] (b)(3), (b)(6), (b)(7)c
Cc: [redacted] (b)(3), (b)(6), (b)(7)c
Subject: RE: Data Request

(b)(3), (b)(6), (b)(7)c

Thanks for following up on this. I don’t think there was ever a definitive answer via email regarding the NAOC training.

If the answer is that there is not a physical record of all of the personnel from VMM-261 in Norway receiving the brief that is ok.

However, if the understanding is that all of the pilots, and specifically that any of the crew of GT31 did receive that brief, it would be helpful to have an email from you and each of the personnel in the CC line stating that and ideally when/where. A flight schedule with the brief as a ground event would be bonus material in that regard if you have it.

(b)(3), (b)(6), (b)(7)c

---Original Message---
Sir,

I'll look to see if there was a roster if that is what you're referring to. I'll see what my team can figure out for you.

I'm not sure a document exists on who reached the site when, but I know my team did not reach the site until 24 March. A spec ops team which included Counter Intel, Navy Seals, and a PJ were on scene either that night or next day.

See if there is any document pertaining to the NAOC safety brief. If we don't have it, maybe ARC can help locate it.

Very Respectfully,

---Original Message---

Is it possible to obtain a couple of products from your team if you have it?

Copy of NAOC Safety Brief Attendance for mishap crew members

Reference document of when and who first reached the mishap site

Thank you,

V/R,

Enclosure (32)
Flights Cancelled due to Weather*, **

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AV-8B</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>CH-53E</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MV-22B</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>UH-1Y</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>AH-1Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>KC-130J</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>F/A-18</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td></td>
<td>2</td>
<td>10</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTALS</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>19</td>
<td>13</td>
<td>18</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>16</td>
<td>109</td>
<td></td>
</tr>
</tbody>
</table>

* DATES NOT DEPICTED - NO WEATHER CANCELLATIONS

** INCLUDES FCF LINES CANX DUE TO WEATHER
| Time   | Sequence Number | Latitude/Longitude (E/NE) | Wind Speed (Knots) | Baro_ALT (in) | Pressure (mbar) | Altitude (ft) | True Heading | Calibrate | Velocity Ver - Normal Acceleration | | Time Difference (s) | Lateral St (inches) | Throttle Position | Pedal Position |
|--------|----------------|----------------------------|-------------------|---------------|----------------|---------------|--------------|-----------|----------------------------------| | | | | |
| 2211:4 | 6              | 4149                       | 66.00354038       | 44.47975031   | 1227.7049     | 52.6757       | 31.9419      | 0.003452 | 0.003452                          | | 0.003452 | 0.003452 | 0.003452 | 0.003452 |
| 2211:5 | 7              | 4149                       | 66.00354038       | 44.47975031   | 1227.7049     | 52.6757       | 31.9419      | 0.003452 | 0.003452                          | | 0.003452 | 0.003452 | 0.003452 | 0.003452 |
| 2211:6 | 8              | 4149                       | 66.00354038       | 44.47975031   | 1227.7049     | 52.6757       | 31.9419      | 0.003452 | 0.003452                          | | 0.003452 | 0.003452 | 0.003452 | 0.003452 |
## BUNO 168330 KVADR Data

**18 March 2022**

**1521:52Z – 1523:03Z**

<table>
<thead>
<tr>
<th>Sequence Numb</th>
<th>Hours Minutes Seconds</th>
<th>Latitude (DEG)</th>
<th>Longitude (DEG)</th>
<th>Wind Sp (KNOTS)</th>
<th>Baro Alt (Feet)</th>
<th>Radar Alt (Feet)</th>
<th>RANGE (KNOTS)</th>
<th>True Heading (DEG)</th>
<th>Lead (KNOTS)</th>
<th>V-Ecc (KNOTS)</th>
<th>N-Acc (KNOTS)</th>
<th>T-Spd (KNOTS)</th>
<th>D-Acc (KNOTS)</th>
<th>Lateral Stick Positioning (X/Y/Z)</th>
<th>Throttle Pedal Positioning (X/Y/Z)</th>
<th>Directional Pedal Positioning (X/Y/Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22773.4</td>
<td>14204</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>24</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
</tr>
<tr>
<td>22777.4</td>
<td>14204</td>
<td>13</td>
<td>23</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>24</td>
<td>245</td>
<td>2592</td>
<td>24</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
</tr>
<tr>
<td>22776.2</td>
<td>14205</td>
<td>22</td>
<td>66.79999501</td>
<td>14.45405765</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22779.4</td>
<td>14205</td>
<td>13</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>24</td>
<td>245</td>
<td>2592</td>
<td>24</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
</tr>
<tr>
<td>22780.2</td>
<td>14205</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22781.5</td>
<td>14206</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22782.4</td>
<td>14206</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22783.5</td>
<td>14207</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22784.6</td>
<td>14208</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22785.7</td>
<td>14209</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22786.8</td>
<td>14210</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
<tr>
<td>22787.9</td>
<td>14211</td>
<td>22</td>
<td>66.00033339</td>
<td>14.4253333</td>
<td>2484</td>
<td>1209</td>
<td>0.5078125</td>
<td>125.125</td>
<td></td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.56875</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td>-0.64292</td>
<td></td>
</tr>
</tbody>
</table>
### BUNO 168330 KVADR Data

**18 March 2022**

**1521:53Z – 1523:03Z**

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Time</th>
<th>R_Number</th>
<th>Latitude (degrees)</th>
<th>Longitude (degrees)</th>
<th>Wind Speed (knots)</th>
<th>Wind Direction (degrees)</th>
<th>Baro_Alt (feet)</th>
<th>Pressure (mbar)</th>
<th>True Heading (degrees)</th>
<th>R_AngleDegrees</th>
<th>Velocity_Ver_Accel (m/s^2)</th>
<th>Tidal_System</th>
<th>RateOfChangeFeetPerSecond</th>
<th>Goad</th>
<th>Lateral Stick Position</th>
<th>Throttle</th>
<th>Directional Stick Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>12776.2</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>22776.6</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>22776.6</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>22776.6</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>22776.6</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>22776.6</td>
<td>1520</td>
<td>12319</td>
<td>45.140000</td>
<td>45.140000</td>
<td>3.5</td>
<td>350</td>
<td>10391.52314</td>
<td>1033.4775</td>
<td>0.7</td>
<td>1.3</td>
<td>-0.006233</td>
<td>1</td>
<td>-0.006233</td>
<td>1</td>
<td>1</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

**Page 3 of 4**

**ENCLOSURE (4H)**

---

This page contains a table of data collected over a period of time, including details such as latitude, longitude, wind speed, barometric altitude, true heading, and various other parameters related to flight data. The data is recorded in a structured format, typical of flight data recorders, which are used to monitor and record aircraft data for safety and operational purposes.
<table>
<thead>
<tr>
<th>TIME (UTC)</th>
<th>1521:53Z – 1523:03Z</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>BUNO 168330 KVADR Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 March 2022</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEQUENCING</th>
<th>HOURS MINUTES SECONDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>14235</td>
<td>14215</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATITUDE (DEG)</th>
<th>LONGITUDE (DEG)</th>
<th>WIND (KNOTS)</th>
<th>WIND DIRECTION (DEG)</th>
<th>BARDALT (Ft)</th>
<th>PRESSURE (IN)</th>
<th>BARO ALTITUDE (Ft)</th>
<th>CALIBRATED A-SHIFT (Ft)</th>
<th>CALIBRATED D-SHIFT (Ft)</th>
<th>TRUE HEADING (DEG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>66.01143096</td>
<td>14.51754553</td>
<td>26.230</td>
<td>23.737</td>
<td>1325</td>
<td>0.20265179</td>
<td>211.5</td>
<td>-3</td>
<td>-0.06</td>
<td>1.05259424</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VELOCITY_VER NORMAL ACCELERATION (Ft/SEC)</th>
<th>VELOCITY_VERT (Ft/SEC)</th>
<th>VELOCITY_HORIZ (Ft/SEC)</th>
<th>VELOCITY_ANGULAR (DEG/SEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.937</td>
<td>0.6</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATERAL STICK POSITION (INCHES)</th>
<th>POSITIONAL ERROR (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.693352</td>
<td>0.109372</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENCLOSEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05259424</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WIDTH</th>
<th>452</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>DIRECTION</th>
<th>TRUE HEADING (DEG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.693352</td>
<td>0.109372</td>
</tr>
<tr>
<td>Sequence</td>
<td>0_hours</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>22754</td>
<td>14221</td>
</tr>
<tr>
<td>22755</td>
<td>14221</td>
</tr>
<tr>
<td>22756</td>
<td>14221</td>
</tr>
<tr>
<td>22757</td>
<td>14221</td>
</tr>
<tr>
<td>22758</td>
<td>14221</td>
</tr>
<tr>
<td>22759</td>
<td>14221</td>
</tr>
<tr>
<td>22760</td>
<td>14221</td>
</tr>
<tr>
<td>22761</td>
<td>14221</td>
</tr>
<tr>
<td>22762</td>
<td>14221</td>
</tr>
</tbody>
</table>

**BUNO 168330 KVADR Data**

18 March 2022

**NAVIGATION DATA**: 1521:53Z – 1523:03Z

**LATERAL MEAN SPEED**: 0.25 feet/second

**THRUST MOMENT**: 0.13 inch-lb

**DIRECTIONAL MOMENT**: 0.13 inch-lb

**ELEVATION**: 165.0 feet

**HORIZONTAL POSITION**: 2.342 degrees

**LATITUDE**: 66.217221016 degrees

**LONGITUDE**: 14.51660116 degrees

**WIND SPEED**: 20.273 feet/second

**BARO ALTITUDE**: 173.43 feet

**PRESSURE**: 29.73 inches

**True_heading**: 15 degrees

**CALIBRATION**: 15 degrees/second

**VELOCITY**: 0.13 feet/second

**NORMAL ACCELERATION**: 0.13 feet/second²

**WIND_DIRECTION**: 15 degrees

**LATERAL_MEAN_SPEED**: 0.25 feet/second

**THRUST_MOMENT**: 0.13 inch-lb

**DIRECTIONAL_MOMENT**: 0.13 inch-lb
### BUNO 168330 KVADR Data

18 March 2022

**1521:52Z – 1523:03Z**

| Time | Sequence | e Number | Hours | Minutes | Seconds | Latitude (Deg) | Longitude (Degrees E) | Wind Speed | Wind Direction (Tide/Feet) | Baro Altitude | Pressure | Rbar Altitude | True Heading |
|------|----------|----------|-------|---------|----------|----------------|----------------------|------------|---------------------------|---------------|-----------|---------------|---------------|---------------|
|      |          |          |       |         |          |                |                      |            |                           |               |           |               |               |               |

**CALIBRATE**

RADARCALIBRATION

**LATERAL**

LATERAL_SYSTEM

**VELOCITY**

VELOCITY

NORMAL ACCELERATION

**LONGITUDINAL**

LONGITUDINAL

**THROTTLE**

DIRECTIONAL

**FUEL**

FUEL

---

**ENCLOSURE**

---

**Page 6**
BUNO 168330 KVADR Data

18 March 2022

1521:53Z – 1523:03Z
<table>
<thead>
<tr>
<th>BUNO 168330 KVADR Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 March 2022</td>
</tr>
<tr>
<td>1521:52Z – 1523:03Z</td>
</tr>
</tbody>
</table>

### Page 8

<table>
<thead>
<tr>
<th>Time</th>
<th>Sequence</th>
<th>e_Number</th>
<th>HOURS</th>
<th>MINUTES</th>
<th>SECONDS</th>
<th>LATITUDE (DEG DEG)</th>
<th>LONGITUDE (DEG DEG)</th>
<th>WIND_SP (WIND)</th>
<th>BARO Altitude</th>
<th>BARO Altitude (S)</th>
<th>TRUE Altitude</th>
<th>DATA</th>
<th>CALIBRATE</th>
<th>G_AIR (C)</th>
<th>G_AIR (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ENCLOSED (3h)

**ENCLOSED (3h)**

- **Longitude System:** FEET/SEC
- **TACHOMETER:** RPM
- **OCTAL:** 0
- **DIRECTIONAL:** 0
- **THROTTLE:** 0
- **PEDAL:** 0

### Flight Data

- **MODE:** AUTO
- **ALTITUDE:** 5000 FT
- **VELOCITY:** 30 KTS

**Ground Data**

- **Position:** X: 456 Y: 507 Z: 234
- **Heading:** 300 DEGREES
- **Directional:** 700
- **Altitude:** 5000 FT

**Airspeed:** 30 KTS

**Dynamics**

- **Roll:** 0
- **Pitch:** 0
- **Yaw:** 0

**Engine Data**

- **Throttle:** 0
- **Pedal:** 0

**Radar Data**

- **Radar:** 0
- **Heading:** 0
- **Direction:** 0
- **Altitude:** 0

**Data Logs**

- **Sequence 1:**
  - **Time:** 00:00
  - **Duration:** 30 MIN
  - **Data:**
    - **Latitude:** 45.0000
    - **Longitude:** -123.0000
    - **Speed:** 30 KTS
    - **Altitude:** 5000 FT

**Additional Details**

- **Live:**
  - **Speed:** 30 KTS
  - **Altitude:** 5000 FT
  - **OCTAL:** 0
  - **DIRECTIONAL:** 0

**Additional Notes**

- **Notes:**
  - **Airspeed:** 30 KTS
  - **Dynamics:**
    - **Roll:** 0
    - **Pitch:** 0
    - **Yaw:** 0

**Flight Conditions**

- **Weather:** Clear
- **Visibility:** Good
- **Temperature:** 15°C

**Flight Path**

- **Route:** Straight and Level
- **Distance:** 40 KM

**Technical Specifications**

- **Engine:** KVADR
- **Maximum Speed:** 30 KTS
- **Range:** 800 KM
- **Climb Rate:** 1000 FT/Min

**Maintenance Information**

- **Service Check:** 200 Hours
- **Inspection:** Monthly
- **Parts:** On Hand

**Emergency Procedures**

- **Emergency Contacts:**
  - **Air Traffic:** March 2022
  - **Medical:** March 2022
  - **Technical Support:** March 2022

**Safety Protocols**

- **Safety Equipments:**
  - **Helmet:** Mandatory
  - **Goggles:** Recommended
  - **Life jacket:** Available

**Miscellaneous**

- **Notes:**
  - **Notes:**
  - **Notes:**
  - **Notes:**
  - **Notes:**
<table>
<thead>
<tr>
<th>Time</th>
<th>Sequence Number</th>
<th>Hours</th>
<th>Minutes</th>
<th>Seconds</th>
<th>Latitude (Degrees)</th>
<th>Longitude (Degrees)</th>
<th>Calibrated Airspeed (Knots)</th>
<th>Radar Altitude (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11198</td>
<td>6998</td>
<td>16</td>
<td>31</td>
<td>32.96875</td>
<td>66.82049361</td>
<td>14.54078858</td>
<td>204.125</td>
<td>1354</td>
</tr>
<tr>
<td>11198.2</td>
<td>6998</td>
<td></td>
<td></td>
<td></td>
<td>66.821118</td>
<td>14.54231878</td>
<td>208.0625</td>
<td>1327</td>
</tr>
<tr>
<td>11198.4</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.821118</td>
<td>14.54231878</td>
<td>208.5</td>
<td>1327</td>
</tr>
<tr>
<td>11198.6</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.821118</td>
<td>14.54231878</td>
<td>208.1875</td>
<td>1288</td>
</tr>
<tr>
<td>11198.8</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.821118</td>
<td>14.54231878</td>
<td>207.3125</td>
<td>1233</td>
</tr>
<tr>
<td>11199</td>
<td>6999</td>
<td>16</td>
<td>31</td>
<td>33.90625</td>
<td>66.8218809</td>
<td>14.5438121</td>
<td>210.375</td>
<td></td>
</tr>
<tr>
<td>11199.2</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.82258833</td>
<td>14.54527432</td>
<td>212.8125</td>
<td></td>
</tr>
<tr>
<td>11199.4</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.82258833</td>
<td>14.54527432</td>
<td>222.0625</td>
<td></td>
</tr>
<tr>
<td>11199.6</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.82258833</td>
<td>14.54527432</td>
<td>222.0625</td>
<td></td>
</tr>
<tr>
<td>11199.8</td>
<td>6999</td>
<td></td>
<td></td>
<td></td>
<td>66.82258833</td>
<td>14.54527432</td>
<td>222.0625</td>
<td></td>
</tr>
<tr>
<td>12000</td>
<td>7000</td>
<td>16</td>
<td>31</td>
<td>35.5</td>
<td>66.82330314</td>
<td>14.54670243</td>
<td>225.875</td>
<td>1178</td>
</tr>
<tr>
<td>12000.2</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82402642</td>
<td>14.54809936</td>
<td>226.75</td>
<td></td>
</tr>
<tr>
<td>12000.4</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82402642</td>
<td>14.54809936</td>
<td>226.75</td>
<td></td>
</tr>
<tr>
<td>12000.6</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82402642</td>
<td>14.54809936</td>
<td>226.75</td>
<td></td>
</tr>
<tr>
<td>12000.8</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82402642</td>
<td>14.54809936</td>
<td>226.75</td>
<td></td>
</tr>
<tr>
<td>1201</td>
<td>7000</td>
<td>16</td>
<td>31</td>
<td>37.109375</td>
<td>66.82475388</td>
<td>14.54947298</td>
<td>229.8125</td>
<td>1003</td>
</tr>
<tr>
<td>1201.2</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82475388</td>
<td>14.54947298</td>
<td>229.8125</td>
<td>1003</td>
</tr>
<tr>
<td>1201.4</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
<td>66.82475388</td>
<td>14.54947298</td>
<td>229.8125</td>
<td>1003</td>
</tr>
<tr>
<td>1201.6</td>
<td>7001</td>
<td>16</td>
<td>31</td>
<td>39.8125</td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1201.8</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1202</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1202.2</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1202.4</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1202.6</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1202.8</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1203</td>
<td>7001</td>
<td></td>
<td></td>
<td></td>
<td>66.8262156</td>
<td>14.55217187</td>
<td>226.9375</td>
<td>773</td>
</tr>
<tr>
<td>1203.2</td>
<td>7002</td>
<td>16</td>
<td>31</td>
<td>38.703125</td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1203.4</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1203.6</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1203.8</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1204</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1204.2</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1204.4</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1204.6</td>
<td>7002</td>
<td></td>
<td></td>
<td></td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>218.1875</td>
<td>751</td>
</tr>
<tr>
<td>1204.8</td>
<td>7003</td>
<td>16</td>
<td>31</td>
<td>38.703125</td>
<td>66.8269481</td>
<td>14.55350686</td>
<td>216.875</td>
<td></td>
</tr>
</tbody>
</table>

BUNO 168330 KVADR Data
17 March 2022
1631.32Z – 1632.21Z

Page 1
<table>
<thead>
<tr>
<th>TIME</th>
<th>HOURS</th>
<th>MINUTES</th>
<th>SECONDS</th>
<th>LATITUDE(DEGREES)</th>
<th>LONGITUDE(DEGREES)</th>
<th>CALIBRATED_AIRSPEED(MTS)</th>
<th>RADAR_ALTITUDE(Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11206.4</td>
<td>7004</td>
<td>16</td>
<td>31</td>
<td>40.296875</td>
<td>14.55484939</td>
<td>216.6875</td>
<td>691</td>
</tr>
<tr>
<td>11206.6</td>
<td>7004</td>
<td>16</td>
<td>31</td>
<td>41.90625</td>
<td>14.55759664</td>
<td>214.9375</td>
<td>698</td>
</tr>
<tr>
<td>11206.8</td>
<td>7004</td>
<td>16</td>
<td>31</td>
<td>43.5</td>
<td>14.56038807</td>
<td>212.5</td>
<td>714</td>
</tr>
<tr>
<td>11207</td>
<td>7004</td>
<td>16</td>
<td>31</td>
<td>45.09375</td>
<td>14.56317119</td>
<td>214.3125</td>
<td>725</td>
</tr>
<tr>
<td>11208</td>
<td>7005</td>
<td>16</td>
<td>31</td>
<td>46.703125</td>
<td>14.56454138</td>
<td>215.1875</td>
<td>868</td>
</tr>
<tr>
<td>11208.2</td>
<td>7005</td>
<td>16</td>
<td>31</td>
<td>47.73572</td>
<td>14.56723734</td>
<td>213.6125</td>
<td>850</td>
</tr>
<tr>
<td>11208.4</td>
<td>7005</td>
<td>16</td>
<td>31</td>
<td>48.296875</td>
<td>14.56855916</td>
<td>214</td>
<td>804</td>
</tr>
</tbody>
</table>

BUNO 168330 KVADR Data
17 March 2022
1631:32Z – 1632:21Z
<table>
<thead>
<tr>
<th>TIME</th>
<th>HOURS</th>
<th>MINUTES</th>
<th>SECONDS</th>
<th>LATITUDE (DEGREES)</th>
<th>LONGITUDE (DEGREES)</th>
<th>CALIBRATED_AIR_SPEED (NOTS)</th>
<th>RADAR_ALTITUDE_DATA (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11214.8</td>
<td>7009</td>
<td>16</td>
<td>31</td>
<td>49.90625</td>
<td>14.56986741</td>
<td>216.8125</td>
<td>774</td>
</tr>
<tr>
<td>11215</td>
<td>7009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11215.2</td>
<td>7009</td>
<td>16</td>
<td>31</td>
<td>51.5</td>
<td>14.57115412</td>
<td>220.5625</td>
<td>738</td>
</tr>
<tr>
<td>11215.4</td>
<td>7009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11215.6</td>
<td>7009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11215.8</td>
<td>7009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11216</td>
<td>7010</td>
<td>16</td>
<td>31</td>
<td>53.09375</td>
<td>14.57370557</td>
<td>219.5</td>
<td>613</td>
</tr>
<tr>
<td>11216.2</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11216.4</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11216.6</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11216.8</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11217</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11217.2</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11217.4</td>
<td>7010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11217.6</td>
<td>7011</td>
<td>16</td>
<td>31</td>
<td>54.703125</td>
<td>14.57902933</td>
<td>214.375</td>
<td>839</td>
</tr>
<tr>
<td>11217.8</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11218</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11218.2</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11218.4</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11218.6</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11218.8</td>
<td>7011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11219</td>
<td>7011</td>
<td>16</td>
<td>31</td>
<td>56.296875</td>
<td>14.58211941</td>
<td>217.9375</td>
<td>1023</td>
</tr>
<tr>
<td>11219.2</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11219.4</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11219.6</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11219.8</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11220</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11220.2</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11220.4</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11220.6</td>
<td>7012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11220.8</td>
<td>7013</td>
<td>16</td>
<td>31</td>
<td>58.211941</td>
<td>14.58211941</td>
<td>217.9375</td>
<td>1023</td>
</tr>
<tr>
<td>11221</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11221.2</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11221.4</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11221.6</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11221.8</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11222</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11222.2</td>
<td>7013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11222.4</td>
<td>7014</td>
<td>16</td>
<td>31</td>
<td>56.296875</td>
<td>14.58211941</td>
<td>217.9375</td>
<td>1023</td>
</tr>
<tr>
<td>11222.6</td>
<td>7014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11222.8</td>
<td>7014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11223</td>
<td>7014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BUNO 168330 KVADR Data**
17 March 2022
1631:32Z – 1632:21Z

**Page 3**
<table>
<thead>
<tr>
<th>TIME</th>
<th>SEQUENCE</th>
<th>HOURS</th>
<th>MINUTES</th>
<th>SECONDS</th>
<th>LATITUDE(DEGREES)</th>
<th>LONGITUDE(DEGREES)</th>
<th>CALIBRATED_AIRSPEED(MNOTS)</th>
<th>RADAR_ALTITUDE_DATA(Feet)</th>
<th>LAST Recorded Location on Mishap Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>11223.2</td>
<td>7014</td>
<td>16</td>
<td>31</td>
<td>57.90625</td>
<td>66.8428282</td>
<td>14.5831071</td>
<td>218.375</td>
<td>995</td>
<td></td>
</tr>
<tr>
<td>11223.4</td>
<td>7014</td>
<td>16</td>
<td>31</td>
<td>57.90625</td>
<td>66.8433519</td>
<td>14.58558801</td>
<td>221.123</td>
<td>948</td>
<td></td>
</tr>
<tr>
<td>11223.6</td>
<td>7014</td>
<td>16</td>
<td>31</td>
<td>57.90625</td>
<td>66.84380771</td>
<td>14.587457</td>
<td>223.875</td>
<td>887</td>
<td></td>
</tr>
<tr>
<td>11223.8</td>
<td>7014</td>
<td>16</td>
<td>31</td>
<td>57.90625</td>
<td>66.84420358</td>
<td>14.58940395</td>
<td>221.875</td>
<td>817</td>
<td></td>
</tr>
<tr>
<td>11224</td>
<td>7015</td>
<td>16</td>
<td>31</td>
<td>59.3</td>
<td>66.84465099</td>
<td>14.59139398</td>
<td>223.875</td>
<td>768</td>
<td></td>
</tr>
<tr>
<td>11225</td>
<td>7015</td>
<td>16</td>
<td>31</td>
<td>59.3</td>
<td>66.84514839</td>
<td>14.59550438</td>
<td>229.9375</td>
<td>693</td>
<td></td>
</tr>
<tr>
<td>11226</td>
<td>7016</td>
<td>16</td>
<td>32</td>
<td>1.09375</td>
<td>66.84487103</td>
<td>14.59343246</td>
<td>224.875</td>
<td>727</td>
<td></td>
</tr>
<tr>
<td>11227</td>
<td>7016</td>
<td>16</td>
<td>32</td>
<td>1.09375</td>
<td>66.84514839</td>
<td>14.59550438</td>
<td>220.875</td>
<td>693</td>
<td></td>
</tr>
<tr>
<td>11228</td>
<td>7017</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.845397</td>
<td>14.59759523</td>
<td>217.875</td>
<td>696</td>
<td></td>
</tr>
<tr>
<td>11229</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>217.875</td>
<td>696</td>
<td></td>
</tr>
<tr>
<td>11229.2</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>217.875</td>
<td>798</td>
<td></td>
</tr>
<tr>
<td>11229.4</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>213.875</td>
<td>798</td>
<td></td>
</tr>
<tr>
<td>11229.6</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>219.875</td>
<td>798</td>
<td></td>
</tr>
<tr>
<td>11229.8</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>219.875</td>
<td>842</td>
<td></td>
</tr>
<tr>
<td>11230</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>219.875</td>
<td>842</td>
<td></td>
</tr>
<tr>
<td>11230.2</td>
<td>7018</td>
<td>16</td>
<td>32</td>
<td>2.6875</td>
<td>66.84562172</td>
<td>14.59969659</td>
<td>219.875</td>
<td>842</td>
<td></td>
</tr>
<tr>
<td>11230.4</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84584644</td>
<td>14.60178199</td>
<td>213.875</td>
<td>842</td>
<td></td>
</tr>
<tr>
<td>11230.6</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84584644</td>
<td>14.60178199</td>
<td>219.3125</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>11230.8</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84584644</td>
<td>14.60178199</td>
<td>219.3125</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>11231</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84609219</td>
<td>14.60387003</td>
<td>218.875</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>11231.2</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84609219</td>
<td>14.60387003</td>
<td>218.875</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>11231.4</td>
<td>7019</td>
<td>16</td>
<td>32</td>
<td>4.296875</td>
<td>66.84609219</td>
<td>14.60387003</td>
<td>218.875</td>
<td>782</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>HOURS</td>
<td>MINUTES</td>
<td>SECONDS</td>
<td>LATITUDE (DEGREES)</td>
<td>LONGITUDE (DEGREES)</td>
<td>CALIBRATED_AIRSPEED (KNOTS)</td>
<td>Radar_altitude_data (feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>---------</td>
<td>---------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>-----------------------------</td>
<td>---------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11231.6</td>
<td>7019</td>
<td>00</td>
<td>00</td>
<td>66.84636871</td>
<td>14.60592544</td>
<td>218.5</td>
<td>732</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11231.8</td>
<td>7019</td>
<td>00</td>
<td>00</td>
<td>66.84668052</td>
<td>14.60794858</td>
<td>217</td>
<td>674</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11232.2</td>
<td>7020</td>
<td>00</td>
<td>00</td>
<td>66.8470308</td>
<td>14.60993106</td>
<td>215.5625</td>
<td>609</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11233.2</td>
<td>7020</td>
<td>00</td>
<td>00</td>
<td>66.84741796</td>
<td>14.61187055</td>
<td>214.75</td>
<td>256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11233.4</td>
<td>7020</td>
<td>00</td>
<td>00</td>
<td>66.84784032</td>
<td>14.61376294</td>
<td>213.5625</td>
<td>384</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11234.4</td>
<td>7021</td>
<td>00</td>
<td>00</td>
<td>66.84829152</td>
<td>14.61561249</td>
<td>212.4375</td>
<td>284</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11235.2</td>
<td>7022</td>
<td>00</td>
<td>00</td>
<td>66.84867675</td>
<td>14.6174275</td>
<td>211.8125</td>
<td>424</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11235.4</td>
<td>7022</td>
<td>00</td>
<td>00</td>
<td>66.84926977</td>
<td>14.61920287</td>
<td>211.225</td>
<td>344</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11235.6</td>
<td>7022</td>
<td>00</td>
<td>00</td>
<td>66.84979968</td>
<td>14.62093449</td>
<td>210.625</td>
<td>344</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11235.8</td>
<td>7022</td>
<td>00</td>
<td>00</td>
<td>66.85035733</td>
<td>14.62261934</td>
<td>210.125</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11236.8</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11237.2</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11237.4</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11237.6</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11237.8</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11238.2</td>
<td>7023</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11238.4</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11238.6</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11238.8</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11239.2</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11239.4</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11239.6</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11239.8</td>
<td>7024</td>
<td>00</td>
<td>00</td>
<td>66.85073883</td>
<td>14.624375</td>
<td>211</td>
<td>743</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BUNO 168330 KVADR Data**

17 March 2022
1631:32Z – 1632:21Z

Profile indicative of short duration terrain crossing at exit point of valley
BONO 168330 KVADR Data  
17 March 2022  
1631:32Z – 1632:21Z
Polaris ACC Bodø - RADAR and radio communication summary regarding GHOST31 flight March 18 2022.

All times UTC.

Freg 118,55Mhz (Polaris ACC): (GHOST 31 departed ENBO 13:33)
13:42:42 GHOST31 checks in on 118,55MHz “Southbound”
14:09:20-14:11:12 “Unreadable” from ATC “contact Stokka freq 120,4Mhz”

There are no transmissions from GHOST31 on 118.55 MHz between 14:11:12 to 15:30:00.

MSSR radar Polaris ACC:
Radar contact between 13:32:44 (departure) until time 13:59:26 (BOO VOR R-211 46Nm)
altitude 1000-1100 ft.
Radar contact between 14:01:50 (STO VOR R-015 35Nm) until time 14:05:25 (STO VOR R-016 28Nm)
altitude 1000-1200 ft.
Radar contact between 14:11:15 (STO VOR R-017 11Nm) until time 14:24:45 (BNN VOR R-320 12Nm)
altitude 800-1100 ft.
Radar contact between 14:26:15 (BNN VOR R-294 11Nm) until time 14:26:44
altitude 900 ft.
Radar contact between 14:32:05 (BNN VOR R-226 14Nm) until time 14:36:47
altitude 300-900 ft.
Radar contact between 14:38:16 (BNN VOR R-165 12Nm) until time 14:39:45 (BNN VOR R-149 9 Nm)
altitude 600 ft.
Radar contact between 14:44:25 (BNN VOR R-077 6 Nm) until time 14:45:30
altitude 900 ft.
Radar contact between 14:46:30 (BNN VOR R-042 6 Nm) until time 14:55:00
altitude 900 ft.

Last shown on MSSR radar at position 65536N0125116E time 14:55, 900 feet, turning southeast.

ENST (Stokka AFIS) last contact with GHOST31 time 1455.
ENMS (Mosjoen AFIS) in contact with GHOST31 time 1458-1501
ENRA (Rana AFIS) in contact between 1504-1510. GHOST31 informed ENRA (Rana AFIS) “Entering your zone in the west to leave to the north" No further contact after that.
Info

- Gul linje viser der vi har hatt radarkontakt med GT31.
- CRC har ikke på noe tidspunkt hatt radiokontakt med GT31.
- På siste posisjon ble GT31 sett med to IFF plott med 12 sekunders mellomrom. Høyde på plott 1 var 2800fot, høyde på plott 2 var 2900fot. På bakgrunn av kun to plott kan vi ikke med sikkerhet si noe om hvilken HDG GT31 hadde.
Info

- Yellow line shows where we have had radar contact with GT31.
- CRC has at no time had radio contact with GT31.
- In the last position, the GT31 was seen with two IFF plots at 12 second intervals. Height of plot 1 was 2800 feet, height of plot 2 was 2900 feet. Based on only two plots, we can not say with certainty which HDG GT31 had.