ANNEX A: COMMUNICATIONS AND
ELECTRONICS OPERATING INSTRUCTIONS (CEOIs)

Time Zone: ZULU

1.   GENERAL

    a.   Definitions

        (1)   Team: A team is defined as a single HF radio station staffed by any number of operators simultaneously or in shifts. The intent is for military units or civilian organizations with multiple stations to register these as distinct and separate teams. Participants wishing to deviate from this definition should contact the Ex OIC;

        (2)   Assignment/Center Frequency: Center of the frequency band assigned to a station. Unless otherwise specified, the frequencies given in these CEOIs are Assignment Frequencies. All channels will operate at 3kHz bandwidth for the duration of the Ex unless otherwise specified;

        (3)   Window/Dial frequency: For certain radio equipment, the frequency which is displayed on the front panel of a radio may reflect the supressed carrier frequency and not the frequency which carries the signal in SSB (either slightly higher or lower depending on LSB or USB operation). For Ex NOBLE SKYWAVE 2024 (Ex NS 24) this will be 1.5 kHz lower than the Assignment Frequency; and

        (4)   Data: Data transmission will be defined as any transmission of text, or computer file from an auxiliary device (laptop, etc.). Any mode of transmission which results in successful transfer of text or file will be acceptable, including but not limited to AMD, 110A, VARA, PSK31, etc. A successful data contact must consist of a file transfer in both directions. (Note: NATO standardization means most military teams will be using 110A).

    b.   Call-signs. Call-signs for each team will be distributed via APPENDIX 1 – Comms Card which will be published on the Ex NS 24 Web App after registration closes and no later than 22 0000Z OCT 24. Teams will be assigned random call-signs based on their location and cannot expect to receive the same call-sign they may have had in a previous year.

    c.   Loss of Contact

        (1)   Should a station lose contact with the net after the initial check in with the Net Control Station (NCS) on day one, the following SOP should be used:

            (a)   Check and adjust antennas and cables, both internal and external;

            (b)   Check frequencies and CEOIs;

            (c)   Turn communications equipment OFF and ON, then attempt to re-establish communications; and

(d)   Attempt to make radio contact with NCS on the following frequencies:

   i.   4.6065 MHz;

   ii.   6.78550 MHz;

   iii.   13.88150 MHz; and

   iv.   20.90150 MHz.

(2)   The NCS will monitor various HF radio frequencies (including the above "loss of contact" frequencies) primarily in SSB. The NCS can also operate in 2G ALE HF, however this is a secondary means available on request;

(3)   If a team is having difficulty contacting the NCS via radio, the team can request the NCS to move to a different frequency based on propagation prediction;

(4)   If a team is unable to contact the NCS via radio or chat room of the Web Application (Web App) located at: https://nobleskywave.ca/, the team can contact the NCS via email: helpdesk@nobleskywave.ca or via phone: 1-613-541-5010 ext. 3869.

2.   <u>REPORTING CONTACTS</u>

a.   All contact reports will be logged and scored via the Ex NS 24 Web App which will be hosted at https://nobleskywave.ca/. No points will be awarded for contacts that are not logged through the Web App. Ships that do not have access to the internet may call the NCS every two hours to report their contacts;

b.   Each team will register on the Web App NLT 16 0000Z OCT 24 IOT gain access to the Ex NS 24 Contact Report interface for the various challenges. Any teams that have not registered on the Web App will have to contact the NCS to gain access to Web App or they will not be scored during the competition;

c.   Individual contact reporting for each of the challenges will be unlocked within the Web App in accordance with the timing provided in phase 2.1, 2.2, 2.3, and 2.4. Teams will be able to report a contact for each challenge once that challenge has started;

d.   The Web App will automatically calculate scores for all contacts that reported it. The scoring scheme is different by challenge/phase (2.1 Establish the Net, 2.2 Free Play, 2.3 Team Contact Challenge, and 2.4 Back to the Future). Points will only be allocated once both teams have reported the same contact on the Web App. For example, if team A reports a contact with team B, the Web App will not award the points until team B reports the same contact from their end. There is a 5 min time limit for the second team to send in the report after the first report is received. The order in which the teams report a contact is unimportant;

e.   Teams may only report ONE contact with each team during each challenge. No points will be awarded for a second contact with the same team. For instance, if during, challenge 2.2 "Free Play", teams A and B report a contact over SSB, even if they subsequently manage a successful contact over 3G ALE they will only be rewarded the points for the SSB contact.

Therefore, it is encouraged to try to make contact over the higher scoring modes before reporting a contact;

f. The Web App contains a scoreboard which will be available at all times for teams to consult. Scoring will be done in real time as the contact reports are being logged in the Web App;

g. The Web App scoring will automatically calculate distance between teams as well as other parameters. It is imperative that teams provide accurate information when registering for the Web App as this feeds the logbook and scoring system. Web App administrators will be confirming all data entered from each of the teams' Ex NS 24 registrations;

h. Ex NS 24 chat rooms (hosted via SLACK) will be available through the Web App for teams to synchronize and coordinate their communication efforts; and

i. Teams having difficulty signing up on the Web App or SLACK should contact the Ex NS 24 planning team at helpdesk@nobleskywave.ca.

3. COMPETITION BREAKDOWN

a. Phase 2.1 - Establishing the Net

(1) Timings

(a) 23 1400Z OCT 24 – 24 0200Z OCT 24.

(2) Execution

(a) Phase 2.1 will be conducted entirely in SSB for HF Radio communication. Communication via Web App will be done via the Ex NS 24 SLACK channels (registration for the SLACK channels is available via the "Chat" tab);

(b) The NCS will have two Harris QRT systems (1x RF-5800, and 1x RF-7800), and a Babcock 36 channel HF monitor receiver system, all setup for SSB;

(c) Multiple antennas will be used by the NCS to accommodate as many participants as possible including: Delta, LPH-89J, LFH 230/1 (Fanlite), and AS-5216 Whip; and

(d) NCS will be monitoring the 16 SSB frequencies in section 3.a.(4).

(3) Scoring

Mode		TX	RX	Points
SSB Analog	Voice	1.5 via radio	1.5 via radio	3
SSB Analog	Voice	1.5 via radio	0.5 via Web App	2
Web App	Web App	0.5 via Web App	0.5 via Web App	1
No contact	N/A	0	0	0

        (a)   <u>Three (3) Points</u>: a completed radio check conducted by C/S and NCS, conducted strictly by voice over HF;

        (b)   <u>Two (2) Points</u>: Half radio check conducted. A team contacts the NCS via voice over HF, NCS receives and responds, but the team cannot hear the NCS. After 2 minutes of NCS trying to contact C/S, if there is no response, the NCS will respond via Web App. In this case only a total of 2 points are awarded;

        (c)   <u>One (1) point</u>: C/S contacted NCS via Web App and NCS responded via Web App. No successful contact over HF; and

        (d)   <u>Zero (0) points</u>: no contact was made with the NCS.

    (4)   <u>Frequencies</u>

Establishing the Net (SSB)		
Serial	Freq	Max Watts
1	3.3905	400
2	4.5765	400
3	4.8665	400
4	5.4015	400
5	6.9815	400
6	7.7015	400
7	10.2915	400
8	13.5685	400
9	16.0355	400
10	20.3015	400
11	27.9115	400
12	3.2800	10,000
13	4.4800	10,000
14	6.9815	10,000
15	9.2935	10,000
16	13.5855	10,000

  b.   <u>Phase 2.2 - Free Play</u>

    (1)   <u>Timings</u>. 24 0200Z OCT 24 – 24 1400Z OCT 24.

    (2)   <u>Execution</u>. This phase is open to all types of HF radio communications to attempt to make contact with as many teams as possible using all available frequencies listed below. The planning team are aware not all teams will have the capability to operate in various modes, the subsequent challenges will even the playing field for teams limited in transmission mode:

(a)   During this phase teams are highly encouraged to attempt communications in different HF radio modes including but not limited to:

      i.   SSB – analog or digital;

      ii.   2G ALE, 3G ALE, 3G+ ALE; and

      iii.   Sending data.

(b)   Use of the SLACK channels to directly coordinate attempts with other teams is highly encouraged.

(3)   <u>Scoring</u>

Mode of Connection	Type of Transmission	Points
SSB	Voice	1
SSB	Data	2.5
2G ALE	Voice	2
2G ALE	Data	3.5
3G(+) ALE	Voice	3
3G(+) ALE	Data	4.5

(a)   Teams are responsible to report scores via Web App as soon as possible after the contact is made. Remember there is a 5 min time limit between each team reporting a contact;

(b)   Should a team successfully contact all stations on all modes, teams are still highly encouraged to continue to participate IOT develop HF operator skills and capabilities; and

(c)   Only one contact can be reported for each team contacted. Therefore it is encouraged to try higher scoring contact types before reporting the contact. If you report an SSB voice contact with a team, you will not be able to report a 3G ALE contact with the same team during this challenge.

(4)   Frequencies

Free Play Frequencies							
Serial	Freq	Serial	Freq	Serial	Freq	Serial	Freq
1	2.0115	22	4.8715	43	9.9425	64	23.0015
2	2.0365	23	4.9015	44	10.1965	65	23.1015
3	2.2735	24	4.9200	45	10.2915	66	23.1695
4	2.3515	25	4.9515	46	10.5625	67	23.3655
5	2.4275	26	5.0365	47	10.9325	68	23.7015
6	2.4475	27	5.2105	48	11.5395	69	24.4015
7	2.4755	28	5.3015	49	12.1165	70	24.5015
8	2.5355	29	5.4015	50	13.4165	71	24.7015
9	2.6675	30	5.8015	51	13.5685	72	25.2655
10	2.6825	31	5.8155	52	13.5855	73	25.4015
11	2.6875	32	5.8335	53	13.9545	74	26.3015
12	2.7015	33	5.9005	54	14.3745	75	26.5015
13	3.2065	34	6.8015	55	14.8425	76	26.7015
14	3.2625	35	6.8445	56	14.9625	77	26.9015
15	3.3215	36	6.9515	57	15.7345	78	27.6715
16	3.3905	37	6.9815	58	16.0355	79	27.7315
17	4.0235	38	7.3115	59	18.2055	80	27.8115
18	4.5765	39	7.7015	60	18.7275	81	27.9115
19	4.6415	40	7.8015	61	20.0195		
20	4.8105	41	7.9015	62	20.2695		
21	4.8665	42	7.9765	63	20.3015		

c.   Phase 2.3 – Team Contact Challenge – SSB, 2G ALE, or 3G ALE

(1)   Timings. 24 1400Z OCT 24 – 25 0200Z OCT 24.

(2)   Execution. For this challenge, teams will be organized into groups based on their transmission capabilities and geographic area. Each team will attempt to make contact with as many of the teams in their group as possible. For this challenge, teams will have to identify on which category they wish to compete in during their initial registration on the Ex NS 24 Web App (SSB-Only, 2G ALE, or 3G ALE). The Web App will only allow the reporting of contacts with teams that registered in the same category. Group assignments (and team call-signs) will be distributed via APPENDIX 1 – Comms Card which will be published on the Ex NS 24 Web App after registration closes and no later than 22 0000Z OCT 24:

(a)   SSB-Only. Teams will attempt to make contact with as many other SSB-only teams as possible on the SSB-Only assigned frequencies below;

(b)   2G ALE Capability. 2G ALE teams will attempt to make contact with as many other 2G ALE teams as possible within their assigned group. 2G ALE capable teams shall program their radios with the contacts and associated frequencies from their group only. All 2G ALE groups will include the NCS as a contact.

(c)　　3G ALE Capability. 3G ALE teams will attempt to make contact with as many other 3G ALE teams as possible within their assigned group only;

(d)　　Teams will be placed in groups containing an equal number of teams. Groups will be balanced with regard to difficulty and geography; and

(e)　　Use of the Web App chatroom (SLACK), as well as email, to directly coordinate attempts with the other teams is highly encouraged.

(3)　　Scoring

(a)　　Scoring for the Team Contact Challenge will be separate from the overall competition scoring this year. Three categories will be made; one for SSB, one for 2G ALE and one for 3G ALE. The first team to contact all the other teams in their group (groups will be defined in APPENDIX 1 – Comms Card) will win in their category. If no team manages to contact all the other teams in their group the team with the most contacts in their group will win. The mode which was submitted in the Web App registration portal will be used to assign that team to a category.

(4)　　Frequencies

Team Contact Frequencies							
2G ALE Teams				3G ALE Teams		SSB Only Teams	
Freq (MHz) C/S 2GNS1		Freq (MHz) C/S 2GNS2		Freq (MHz) C/S 3GNS1		Freq (MHz) SSB	
Serial	Freq	Serial	Freq	Serial	Freq	Serial	Freq
1	2.0115	1	2.0365	1	2.2735	1	2.3515
2	2.4275	2	2.4475	2	2.4755	2	2.5355
3	2.6675	3	2.6825	3	2.6875	3	2.7015
4	3.2065	4	3.2625	4	3.3215	4	3.3905
5	4.0235	5	4.5765	5	4.6415	5	4.8105
6	4.8665	6	4.8715	6	4.9015	6	4.9200
7	4.9515	7	5.0365	7	5.2105	7	5.3015
8	5.4015	8	5.8015	8	5.8155	8	5.8335
9	5.9005	9	6.8015	9	6.8445	9	6.9515
10	6.9815	10	7.3115	10	7.7015	10	7.8015
11	7.9015	11	7.9765	11	9.9425	11	10.1965
12	10.2915	12	10.5625	12	10.9325	12	11.5395
13	12.1165	13	13.4165	13	13.5685	13	13.5855
14	13.9545	14	14.3745	14	14.8425	14	14.9625
15	15.7345	15	16.0355	15	18.2055	15	18.7275
16	20.2695	16	20.3015	16	23.0015	16	23.1015
17	23.1695	17	23.3655	17	23.7015	17	24.4015
18	24.5015	18	24.7015	18	25.2655	18	25.4015
19	26.3015	19	26.5015	19	26.7015	19	26.9015
20	27.6715	20	27.7315	20	27.8115	20	27.9115

    d.   <u>Phase 2.4 – Back to the Future Challenge</u>

        (1)   <u>Timings</u>. 25 0200Z OCT 24 – 25 1400Z OCT 24.

        (2)   <u>Execution</u>. Each team will utilize SSB voice or data to attempt to make contact with as many teams as possible.

            (a)   The greater the distance between the two teams or the mode of transmission the greater the points; and

            (b)   Use of Web App chat room or email to contacts to directly coordinate attempts with the other teams POCs is highly encouraged.

        (3)   <u>Scoring</u>

Distance (km)	Mode	Points
0 to 1000	Voice	1
	Data	2
1000 to 3000	Voice	2
	Data	3
3000 to 5000	Voice	3
	Data	4
5000 to 7000	Voice	3.5
	Data	4.5
7000 to 9000	Voice	4
	Data	5
9000 to 11000	Voice	4.5
	Data	5.5
11000 to 13000	Voice	5
	Data	6
13000 to 15000	Voice	5.5
	Data	6.5
More than 15000	Voice	6
	Data	7

            (a)   <u>Scoring</u>:

                i.   1 point awarded for each successful contact being 0 km to 1000 km;

                ii.   2 points awarded for each successful contact of more than 1000 km but less than 3000 km;

                iii.   3 points awarded for each successful contact of more than 3000 km but less than 5000 km;

                iv.   3.5 points awarded for each successful contact of more than 5000 km but less than 7000 km;

        v.   4 points awarded for each successful contact of more than 7000 km but less than 9000 km;

        vi.   4.5 points awarded for each successful contact of more than 9000 km but less than 11000 km;

        vii.   5 points awarded for each successful contact of more than 11000 km but less than 13000 km;

        viii.   5.5 points awarded for each successful contact of more than 13000 km but less than 15000 km;

        ix.   6 points awarded for each successful contact of 15000 km or more; and

        x.   an additional point will be awarded for transmitting data.

(b)   Teams are responsible to report scores to the NCS on Web App as soon as possible. Ships that do not have access to internet may call the NCS to report their contacts; and

(c)   Upon reaching all stations, teams are still highly encouraged to continue to participate IOT develop HF operator skills and capabilities.

(4)   Frequencies:

Back-to-the-Future Frequencies							
Serial	Freq	Serial	Freq	Serial	Freq	Serial	Freq
1	2.0115	22	4.8715	43	9.9425	64	23.0015
2	2.0365	23	4.9015	44	10.1965	65	23.1015
3	2.2735	24	4.9200	45	10.2915	66	23.1695
4	2.3515	25	4.9515	46	10.5625	67	23.3655
5	2.4275	26	5.0365	47	10.9325	68	23.7015
6	2.4475	27	5.2105	48	11.5395	69	24.4015
7	2.4755	28	5.3015	49	12.1165	70	24.5015
8	2.5355	29	5.4015	50	13.4165	71	24.7015
9	2.6675	30	5.8015	51	13.5685	72	25.2655
10	2.6825	31	5.8155	52	13.5855	73	25.4015
11	2.6875	32	5.8335	53	13.9545	74	26.3015
12	2.7015	33	5.9005	54	14.3745	75	26.5015
13	3.2065	34	6.8015	55	14.8425	76	26.7015
14	3.2625	35	6.8445	56	14.9625	77	26.9015
15	3.3215	36	6.9515	57	15.7345	78	27.6715
16	3.3905	37	6.9815	58	16.0355	79	27.7315
17	4.0235	38	7.3115	59	18.2055	80	27.8115
18	4.5765	39	7.7015	60	18.7275	81	27.9115
19	4.6415	40	7.8015	61	20.0195		
20	4.8105	41	7.9015	62	20.2695		
21	4.8665	42	7.9765	63	20.3015		

e.   Phase 2.5 – End Ex

(1)   Timings. 25 1400Z OCT 24 – 25 1600Z OCT 24.

(2)   Execution. The NCS will tally the scoring and announce the winner for each category.

(a)   The winner will be announced to all via HF on the Loss of Contact frequencies and https://nobleskywave.ca/ chat room;

(b)   Winners will be announced as per the following categories:

i.   1 to 150W: Overall score from Establish the Net, Free Play and Back to the Future;

ii.   150 to 400W: Overall score from Establish the Net, Free Play and Back to the Future;

iii.   More than 400W: Overall score from Establish the Net, Free Play and Back to the Future. If the winning team from a lower power category wins, the higher power category will not be announced;

iv.   SSB Category winner for the Team Contact Challenge;

v.   2G ALE Category winner for the Team Contact Challenge;

vi.   3G ALE Category winner for the Team Contact Challenge; and

vii.   Longest distance contact during the Back to the Future Challenge.

(c)   The full Ex NS 24 Scoreboard will remain up on the website for two weeks after the competition.

4.   ADDITIONAL FREQUENCIES

In addition, the following frequencies may be used (with caveats) during the Establish the Net, Free Play, Team Contact, and Back to the Future challenges:

Serial	Freq	Power	Bandwidth
1	5.2964MHz	400W	2kHz

5.   DIAL FREQUENCIES

For corresponding dial frequencies, refer to the Ex Noble Skywave 2024 frequency assignment.

Appendix 1: Comms Card – To Be Issued
Appendix 2: Ex Noble Skywave Frequency Assignment – Available at www.nobleskywave.ca