EKC2022
Europe-Korea Conference on Science and Technology

G-NAOE 2022
Smart Technology into Green Ocean
November 6 (Sun) - 10 (Thu), 2022
Changwon Exhibition Convention Center (CECO), Korea

Smart Technology into Green Ocean

Global Conference on Naval Architecture and Ocean Engineering 2022

6 to 10 November, 2022
CECO, Changwon, Republic of Korea



21(Thu) July, 2022

Hyun-Soo Kim
General Co-chair, G-NAOE 2022
Prof. Inha Technical College

Hosted by
The Society of Naval Architects of Korea (SNAK)

Organized by
G-NAOE 2022 Organization Committee

Contact
G-NAOE 2022 Secretariat Office

Overview of the G-NAOE 2022

Title	Global Conference on Naval Architecture and Ocean Engineering 2022
Date/Venue	6 to 10 November, 2022 / CECO, Changwon, Korea
Slogan	Smart Technology into Green Ocean
Hosted by	The Society of Naval Architects of Korea (SNAK)
Organized by	G-NAOE 2022 Organization Committee
Program	Opening/Closing, Keynote, Panel Discussion, Parallel Scientific Sessions, Networking Seminar, Sponsor's Night, G-NAOE Wave, Technical & Culture Tours



Organization Committee

Conference Chair (2)	General Co-chairs (1)	Hyun Soo Kim(Inha Technical College)
	General Co-chairs (1)	Shin Hyung Rhee(Seoul National University)
Secretary General (1)	Secretary General (1)	Kwang Hyo Jung(Pusan National University)
LOC (Local Organizing Committee) (8)	Finance Chair (1)	Cheolho Ryu(Inha Technical College)
	Social Program Co-chairs (3)	Jun Soo Park(Kyungnam University)
		Bon Guk Koo(Changwon National University)
		Min Joo Choi(Korea Maritime & Ocean University)
	Publication Chair (1)	Bu Geun Paik(KRISO)
	Promotion Chair (1)	Joonmo Choung(Inha University)
	General Arrangement Co-chairs (2)	Seung Jae Lee(Korea Maritime & Ocean University)
		Inwon Lee(Pusan National University)

Advisory Committee (3)	Jong Gye Shin(KSOE)
	Jeom Kee PAIK(Pusan National University)
	Hyo Jae JO(Korea Maritime and Ocean University)

TPC (Technical Program Committee) (67)	Sub-committee I Alternative Fuel (7)	Kwang Pil Chang(KSOE)
		Hee Jin Kang(KRISO)
		Yuseok Kim(DNV Maritime Korea)
		Ho Ki Lee(Samsung Heavy Industries)
		Youngsub Lim(Seoul National University)
		Byeong-Yong Yoo(KSOE)
		Ki Doo Kim(KSOE)
	Sub-committee II Design & Performance (12)	Seong Yeob Jeong(KRISO)
		Bo Woo Nam(Seoul National University)
		Beom Seon Jang(Seoul National University)
		Yooil Kim(Inha University)
		Sunho Park(Korea Maritime & Ocean University)
		Kwang-Jun Paik(Inha University)
		Hyoung Seock Seo(University of Ulsan)
		Byoung Kwon Ahn(Chungnam National University)
		Sung Wook Lee(Korea Maritime & Ocean University)
		Young Bum Lee(DSME)
		Hyun-ho Lee(Hyundai Heavy Industries)
		Ju-Hwan Cha(Mokpo National University)
	Sub-committee III Decarbonization (Greenship & Shipping and Logistics) (8)	Wooseung Sim(KSOE)
		Mingyu Kim(KMC)
		Taeil Kim(KMI)
		Kyungtae Yun(Samsung Heavy Industries)
		Kang Hyun Song(KR)
		Jae Hun Lim(DNV)
		Yun-Suk Chung(BV)
		Kang Woo Chun(KR)
	Sub-committee IV Marine Material & Equipment (7)	Joong Kyoo Kang(DSME)
		Young Shik Kim(KRISO)
		Hyoung Seog Kim(DSME)
		Sang Beom Shin(KSOE)
		Byung Ki Choi(Hyundai Heavy Industries)
		Sun Woo Hwang(KOMEA)
		Dae-Soo Kim(BV)

TPC (Technical Program Committee) (67)	Sub-committee V Maritime Autonomous Surface Ships (5)	Tae Bum Ha(KR)
		Jong Yong Park(Pukyong National University)
		Dong Jin Yeo(KRISO)
		Hyeon Kyu Yoon(Changwon National University)
		Hwasup Jang(KR)
	Sub-committee VI Digitalization (16)	Hyun Joe Kim(Samsung Heavy Industries)
		Byoung-Hun Kwon(KSOE)
		Jong Hun Woo(Seoul National University)
		Seunghyeon Yoo(DNV)
		Heung-won Suh(DINC)
		Jungseo Park(Samsung Heavy Industries)
		Jang Hyun Lee(Inha University)
		Cheol-Eun Heo(DSME)
		Dongha Lee(KSOE)
		Sangmin Han(Samsung Heavy Industries)
		HyungWoo Kim(KRISO)
		Myung-Il Roh(Seoul National University)
		Jackyou Noh(Kunsan National University)
		Min Joo Choi(Korea Maritime & Ocean University)
		Won Sun Ruy(Chungnam National University)
		Hyun Chung(Chungnam National University)
	Sub-committee VII Marine Resources & Energy Technology (5)	Yu Taek Seo(Seoul National University)
		Seung Jae Lee(Korea Maritime & Ocean University)
		Min Oh JANG(DNV)
		Wang-geun Lee(Samsung Heavy Industries)
		Chang-Hyuk Shin(BV)
	Sub-committee VIII Offshore Renewable Energy (7)	Weon Cheol Koo(Inha University)
		Young Min Paik(DNV)
		Kyong-Hwan Kim(KRISO)
		Jun Soo Park(Kyungnam University)
		Yoon Hyeok Bae(Jeju National University)
		Sung-chul Shin(Pusan National University)
		June Lee(Inha Technical College)

International Organizing Committee

Categories	Name	Affiliation	Country
International Organizing Committee (11)	Prof. Jiahn-Horng Chen	TSNAME	Taiwan
	Dr. Fabio Di Felice	Istituto di Ingegneria del Mare	Italy
	Prof. Masahiko Fujikubo	JASNAOE	Japan
	Dr. Alex Lee	KOEA	USA
	Dr. Yongwon Lee	Lloyd's Register	UK
	Dr. Sime Malenica	BV	France
	Prof. Eric May	University of Western Australia	Australia
	Prof. Nikola Vladimir	University of Zagreb	Croatia
	Prof. Decheng Wan	Shanghai Jiao Tong University	China
	Dr. Jungyong (John) Wang	National Research Council Canada	Canada
	Prof. Airil Yasreen Bin Mohd Yassin	Heriot-Watt University Malaysia	Malaysia

※ The G-NAOE Organization Committee consists of two General Co-chairs, one Secretary General, 3 Advisory Committees, 8 Local Organization Committees with 5 subcommittees, and 68 Technical Program Committees with 8 subcommittees. And finally, it is composed of an International Organizing Committee of 11 people. **The total number of committee members is 93.**



Program at a Glance

<table>
<tr><th></th><th>6 (Sun) Nov, 2022</th><th>7 (Mon) Nov, 2022</th><th>8 (Tue) Nov, 2022</th><th>9 (Wed) Nov, 2022</th><th>10 (Thu) Nov, 2022</th></tr>
<tr><td>07:00~07:30</td><td rowspan="15"></td><td rowspan="2"></td><td colspan="2" rowspan="2">Networking Seminar</td><td colspan="2" rowspan="2">Networking Seminar</td><td rowspan="2"></td></tr>
<tr><td>08:00~08:30</td></tr>
<tr><td>08:30~09:00</td><td rowspan="2">Registration</td><td colspan="2">Registration</td><td colspan="2">Registration</td></tr>
<tr><td>09:00~09:30</td><td colspan="2" rowspan="2">Keynote Speech('50)</td><td colspan="2" rowspan="2">Keynote Speech('50)</td><td rowspan="12">Technical &
Yacht Tours</td></tr>
<tr><td>09:30~10:00</td><td rowspan="5">Opening('30)
&
Keynote Speech('50)
&
Panel Discussion('50)</td></tr>
<tr><td>10:00~10:30</td><td>[Emerging Topic III]
Maritime Autonomous Surface Ships II</td><td>[Emerging Topic IV]
Smart Yard</td><td>[Emerging Topic V]
Alternative Fuel</td><td>[Emerging Topic VI]
Marine Resources & Energy Technology</td></tr>
<tr><td>10:30~11:00</td><td></td></tr>
<tr><td>11:00~11;30</td><td></td></tr>
<tr><td>11:30~12:00</td><td></td></tr>
<tr><td>12:00~12:30</td><td rowspan="2">Welcome Luncheon</td><td colspan="2" rowspan="2">Lunch</td><td colspan="2" rowspan="2">Lunch</td></tr>
<tr><td>12:30~13:00</td></tr>
<tr><td>13:00~13:30</td><td rowspan="4">[Emerging Topic I]
Maritime Autonomous Surface Ships I</td><td colspan="2" rowspan="5">[Parallel Scientific Sessions]
Technical Scientific Session
&
Organized Sessions</td><td colspan="2" rowspan="5">[Parallel Scientific Sessions]
Technical Scientific Session
&
Organized Sessions</td></tr>
<tr><td>13:30~14:00</td></tr>
<tr><td>14:00~14:30</td></tr>
<tr><td>14:30~15:00</td></tr>
<tr><td>15:00~15:30</td></tr>
<tr><td>15:30~16:00</td><td rowspan="3">Registration</td><td rowspan="3">[Emerging Topic II]
Green ship</td></tr>
<tr><td>16:00~16:30</td></tr>
<tr><td>16:30~17:00</td></tr>
<tr><td>17:00~17:30</td><td rowspan="4">Welcome Reception</td><td rowspan="5">G-NAOE Wave</td></tr>
<tr><td>17:30~18:00</td></tr>
<tr><td>18:00~18:30</td><td colspan="2" rowspan="2">Sponsor's Night
(Invitation only)</td><td colspan="2" rowspan="2">Banquet</td></tr>
<tr><td>18:30~19:00</td></tr>
<tr><td>19:00~19:30</td><td></td></tr>
<tr><td>19:30~20:00</td><td></td></tr>
</table>

Invited Speakers for the Emerging Topics

Special sessions on more than 6 Emerging topics were planned, and speakers were invited as the best experts who lead trends for each session.

Category	Name & Affiliation
Emerging Topic I Maritime Autonomous Surface Ships I	 Dr. Ørnulf Jan Rødseth SINTEF Ocean, Norway
	 Prof. Hyungju Kim University of South-Eastern Norway (USN), Norway
	 Dr. Jongjin Park Samsung Heavy Industries, Republic of Korea
Emerging Topic II Decarbonization	 Mr. Anders Valland SINTEF Ocean, Norway
	 Mr. Gavin Allwright IWSA, England
	 Dr. Christos Chryssakis Det Norske Veritas (DNV), Norway
Emerging Topic III Maritime Autonomous Surface Ships II	 Dr. Louis Benito Lloyd 's Register, UK
	 Mr. Inil Kim DSME, Republic of Korea
	 Dr. Joung-Hum Yeon Busan Port Authority, Republic of Korea

Category	Name & Affiliation
Emerging Topic IV Smart Yard	 Prof. Jong Gye Shin KSOE, Republic of Korea
	 Mr. Jin-Hyung Park Samsung Heavy Industries, Republic of Korea
	 Dr. Seunghyeon Yoo DNV, Norway
Emerging Topic V Alternative Fuel	 Mr. Thomas Storgaard Hansen MAN Energy Solution, Denmark
	 Ms. Torill Osberg Det Norske Veritas (DNV), Norway
	 Mr. Rob Tustin Lloyd 's Register, UK
Emerging Topic VI Marine Resources & Energy Technology	 Prof. Eric May University of Western Australia, Australia
	 Dr. Sung-Oh Yang Wood group, Malaysia
	 Mr. Young Chan PARK Williams, USA

Statistics of the submitted papers

Technical Session

Technical session is a session in which participants present their papers under eight themes.
Total of 125 papers from 13 countries were received for eight G-NAOE 2022 topics.
The latest papers will be presented in five session rooms over two days.

Topic	Papers	Topic	Papers
1. Alternative Fuel	09	5. Maritime Autonomous Surface Ships	14
2. Design & Performance	42	6. Digitalization	26
3. Decarbonization	10	7. Marine Resources & Energy Technology	09
4. Marine Material & Equipment	05	8. Offshore Renewable Energy	10
Total	125		

Special Organized Session

Special Organized Session is organized by naval architecture and ocean engineering experts who are interested in emerging topics. About 50 papers on eight key words will be presented in two session rooms over two days.

Key words	Organizing Affiliation
Green Ship	KRISO
Maritime Autonomous Surface Ships	KRISO
Arctic and Fourth Industrial Revolution (Eco-friendly ESG)	KRISO, KMI
IMO Rule	KMC
Smart shipping (CII)	KR
Eco-friendly equipment	KOMERI
EU De-carbonization Legislation	KR
Carbon-neutral Steel	Inha Univ., Hyundai Steel

Social Program

Welcome Reception

Please join an ice-breaking event for getting to know each other. All participants who registered G-NAOE 2022 are invited to the welcome reception. Do not miss networking opportunities and fresh, delicious meals with other participants.

Opening Ceremony

The Opening Ceremony will be held on Monday, November 7th at CECO in Changwon. At the opening ceremony, G-NAOE 2022 begins with the opening remarks.

Welcome Luncheon

Participants and guests will celebrate the grand opening of the international conference, Global Conference on Naval Architecture and Ocean Engineering 2022, and will be warmly welcomed.

G-NAOE Wave

G-NAOE Wave is a casual event that the future leading participants could customize the program. Attending this event is an excellent opportunity to gain exposure to new and diverse multidisciplinary knowledge of the naval architecture and ocean engineering sector.

Sponsor's Night

Chairman's invitation dinner for sponsors. Attending the reception is an excellent opportunity for professionals to broaden their professional network.

Banquet

After the third day when every technical session is over, we invite you to join a banquet. For a memorable time, special performances are to be performed. Begin with the opening speech, banquet speech, and the toast ceremony are ready to be delivered. Enjoy the dinner with beautiful performances!









Registration Information

Categories	Registration Fee		
	Early Registration (1~30 September, 2022)	**Late Registration** (1~20 October, 2022)	**On-Site Registration** (6~10 November, 2022)
Regular Participant	USD 700	USD 800	USD 800
Regular Presenter	USD 500	USD 600	USD 600
Student	USD 300	USD 400	USD 400

G-NAOE 2022 will be held as HYBRID conference focused on In-PESRSON presentation.

Autumn in Korea

South Korea is a country in Eastern Asia occupying the southern half of the Korean Peninsula. South Korea's terrain is mostly mountainous.
Daily high temperatures in November decrease around 14~16℃.
The weather in November in Korea is cool and it is not a rainy season, so it is very good to travel.



Host city, Changwon

Changwon is the central city and industrial complex of the shipbuilding and marine industries of the Republic of Korea.

Changwon is located adjacent to Ulsan and Busan, another representative maritime city in Korea.
Also Changwon is adjacent to various researchers and shipyards, making it good to visit various places during technical tours.



Visa

1. K-ETA (Electronic Travel Permit System)

What is K-ETA?

-It is an electronic travel permit system that pre-registers personal information of foreigners who want to enter Korea without a visa operated by the Immigration and Foreign Policy Headquarters of the Ministry of Justice of Korea.

K-ETA Application Eligibility Country:
Singapore, Spain, France, Norway, United Kingdom, USA States, Sweden, Denmark, Austria, Italy, etc.

2. C3 Visa

What is C3?

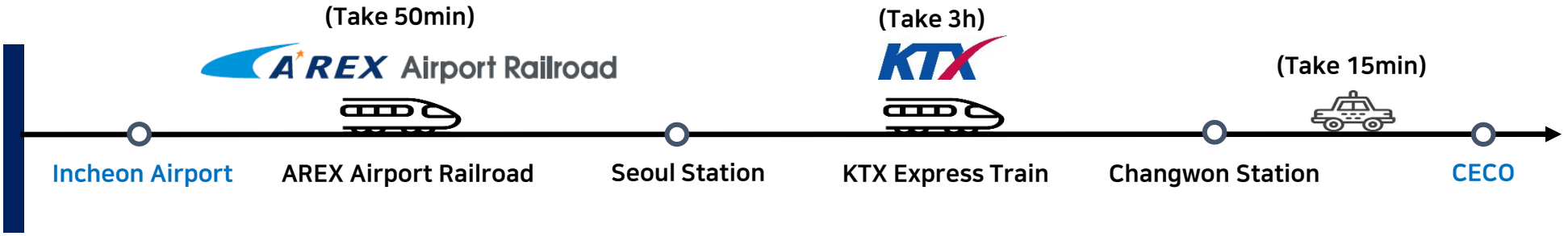
- C3 Visa is a type of short-term visitor visa for foreigners who want to stay within 90 days for the purpose of tours, attending various events, market research and business observation.
- It is a visa that participants must apply directly through overseas diplomatic offices.

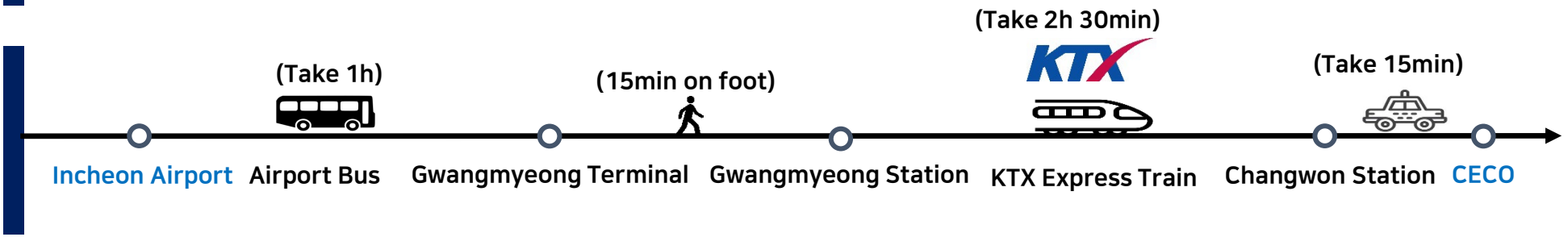
C3 Application Eligibility Country:
Japan, Canada, Indonesia, China, Vietnam etc.

Korea Visa Portal Website: https://visa.go.kr/main/openMain.do
Contact Center +82-1345

Secretariat of G-NAOE 2022
E-mail: _____
Contact Number

Incheon Airport to CECO, Changwon





Gimhae Airport to CECO, Changwon



Technical Tour

- Date: 10 November, 2022
- Time: 08:00 AM ~ 04:00 PM
- Course



DEPARTURE 08:00 am → Tour Destination 1 (KOMERI) → Tour Destination 2 (KRISO) → Lunch & Yacht Tour → Tour Destination 3 (HYUNDAI HEAVY INDUSTRIES CO.,LTD.) → ARRIVAL 04:00 pm




KOMERI



KRISO



HYUNDAI HEAVY INDUSTRIES







Yacht Tour





LUNCH



Sponsors

HYUNDAI HEAVY INDUSTRIES GROUP

KSOE KOREA SHIPBUILDING & OFFSHORE ENGINEERING
HYUNDAI HEAVY INDUSTRIES
HYUNDAI MIPO DOCKYARD
HYUNDAI SAMHO HEAVY INDUSTRIES

SAMSUNG HEAVY INDUSTRIES

GNTP Gyeongnam Technopark

DSME 대우조선해양주식회사 DAEWOO SHIPBUILDING & MARINE ENGINEERING CO.,LTD.

KRISO KOREA RESEARCH INSTITUTE OF SHIPS & OCEAN ENGINEERING

Lloyd's Register

KR KOREAN REGISTER

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

Agency for Defense Development

HYUNDAI STEEL

대한민국해군 REPUBLIC OF KOREA NAVY

해양경찰청 KOREA COAST GUARD

KOMERI

RIMS 중소조선연구원 Research Institute of Medium & Small Shipbuilding

K Shipbuilding

DAESUN SHIPBUILDING & ENGINEERING CO.,LTD.

dsec

WONBANG FORCETECH

KOSHIPA Korea Offshore & Shipbuilding Association

Bumhan

reaTech

KMI

KOMEA

KMC

INHA UNIVERSITY

Global Conference on Naval Architecture and Ocean Engineering 2022

G-NAOE 2022

6 to 10 November, 2022 / CECO, Changwon, Republic of Korea



Welcome to join us in Republic of Korea!