# Integrating chemical oxygen generators into existing platforms

Peter Hutchinson



## Integrating chemical oxygen generators into existing platforms

Over the past few years several nations have integrated MPOG and EO2-30 chemical oxygen generators into their existing platforms. This is either as a direct replacement for outdated technology or to provide supplemental oxygen capability onboard for operational and tactical use.

The Royal Norwegian Navy is the latest nation to deploy MPOGs across their Ula-class fleet. This session will share how the partnership developed between Molecular Products and the Navy and how we are supporting the platform-wide conversion from obsolete aerospace oxygen generators to chemical O2 designed for submarine use.

The session will also discuss chemical oxygen generators as a supplemental oxygen source onboard Class 209 submarines.

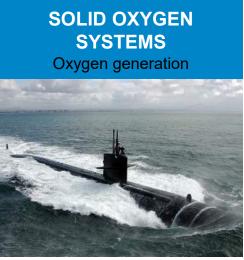


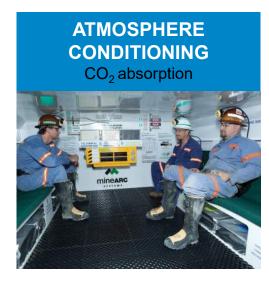
#### **Mission critical**

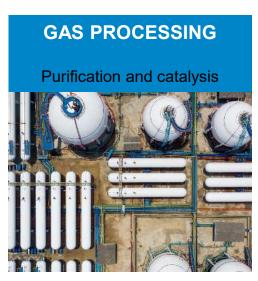
#### **Atmosphere management solutions**

Highly technical chemical media solutions that maintain breathable and high purity atmospheres in life and mission critical applications



















### Why oxygen generators?

- Oxygen generators are used to supply emergency O<sub>2</sub> solutions for submarines, mine refuge chambers, aircraft, safe havens and to start a reaction
- Deployed when primary system failed, or alternative source needed:
  - Safe, simple and reliable oxygen source
  - More efficient than compressed O<sub>2</sub>
  - Long shelf-life
  - No external power required
  - Self-contained
  - No stored pressure
  - Easier to stow

Solid Oxygen	Compressed Air
High O2 storage density	Low storage density
No maintenance	Maintenance every 6-12 months
Not explosive	Explosive if punctured or exposed to fire
No valves/pressure regulators	Valves and regulators can fail
No stored pressure	Bottles can leak
10 year shelf-life	Need regular refilling



### Oxygen generator portfolio



#### CAN33

3341

295×165

12.7

40-60



#### **MPOG**

2600

400×133×133

12 2

60-90



#### **eMPOG**

2600

385×128×128

WEIGHT (KG)

12.2

60-90



#### E02-30

3000

420×142×140

WEIGHT (KG)

15

25-45



#### ROG

OXYGEN (LITERS)

90

284×119×118

WEIGHT (KG)

2.3

DURATION (MINS)

5





## **MPOG** start





#### **Royal Norwegian Navy and Molecular Products**

## The challenge

- Existing 1500L generator being discontinued and replaced with 300L alternative
- Presented storage issues onboard 240 more generators per compartment
- Requirement for product designed to withstand submarine environment
- Rebuilding the stowing racks on the submarines



138mm x 285mm





300 litre 85mm x 250mm



#### **Royal Norwegian Navy and Molecular Products**

## The opportunity / solution

- Proven technology:
  - MPOG widely used onboard submarine fleets
- Designed for application:
  - MilSpec MPOG designed for use onboard submarines, in partnership with Royal Navy
- Reduces storage space:
  - More than halves the required storage space compared to the 300L generator
  - Square vs Round
- Partnership approach:
  - Molecular Products has long history of partnership working with navies and shipyards to integrate O2 generators into new and existing platforms







## Royal Norwegian Navy and Molecular Products The relationship

- First meeting at SAMAP 2019 in Crete
- Supported Navy with team made up of commercial, technical and quality representatives
- March 22 Norway ready to start replacement programme onboard their 6 submarines
- Urgent requirement to fit out first submarine in for maintenance production schedule changed to meet this requirement for them – first delivery June 2022
- June 2022 Site visit by Norwegian Navy, including crew trainer for our products, to show manufacturing site, answer technical/use questions
- Supported Navy after first delivery technical questions/test data



## **Royal Norwegian Navy and Molecular Products The solution**



Right - Aus Navy holder for active MPOG
 Left - Norwegian Navy solution for active MPOG
 Bottom left - Stowage solution for MPOG units
 Bottom Right - Can33 furnace









#### Type 209, 212 and 214

### Supplemental oxygen

- Increase in demand for backup oxygen for Type 209, 212 and 214 platforms
- Molecular Products' working with these nations to work through safety and change protocols
- End user product training is encouraged to ensure safety and understanding







# Thank you

