



# AAPA Cruise Seminar

Fort Lauderdale, Florida

February 11, 2015

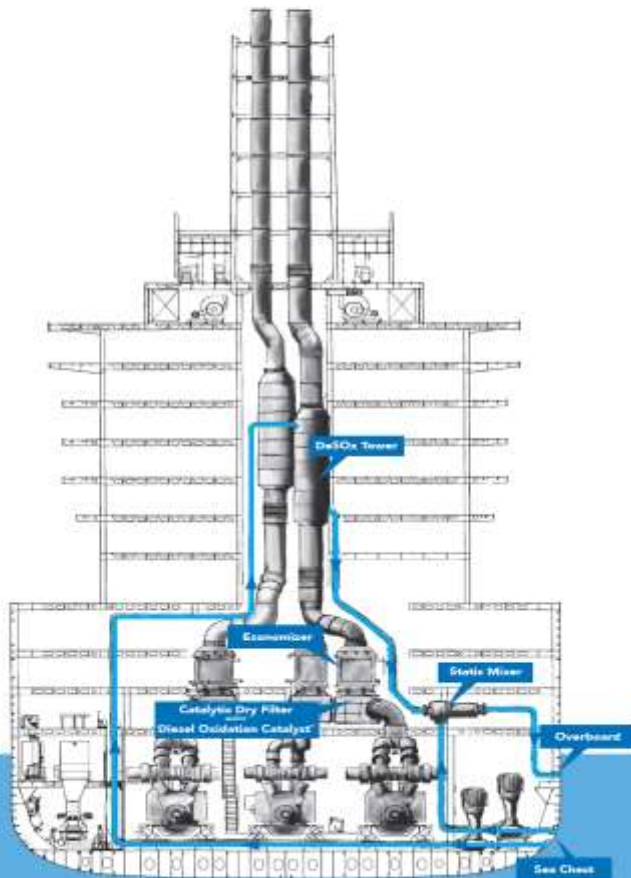


# AIDA luna Installation Video



201405\_luna\_Filtertausch\_HD Video.mp4

# ECO-EGC SYSTEM OPEN LOOP



In cooperation with: Halden Systems A/S

## SeaWater Scrubber Tower Installation



## December Photos: Deliziosa in Palermo

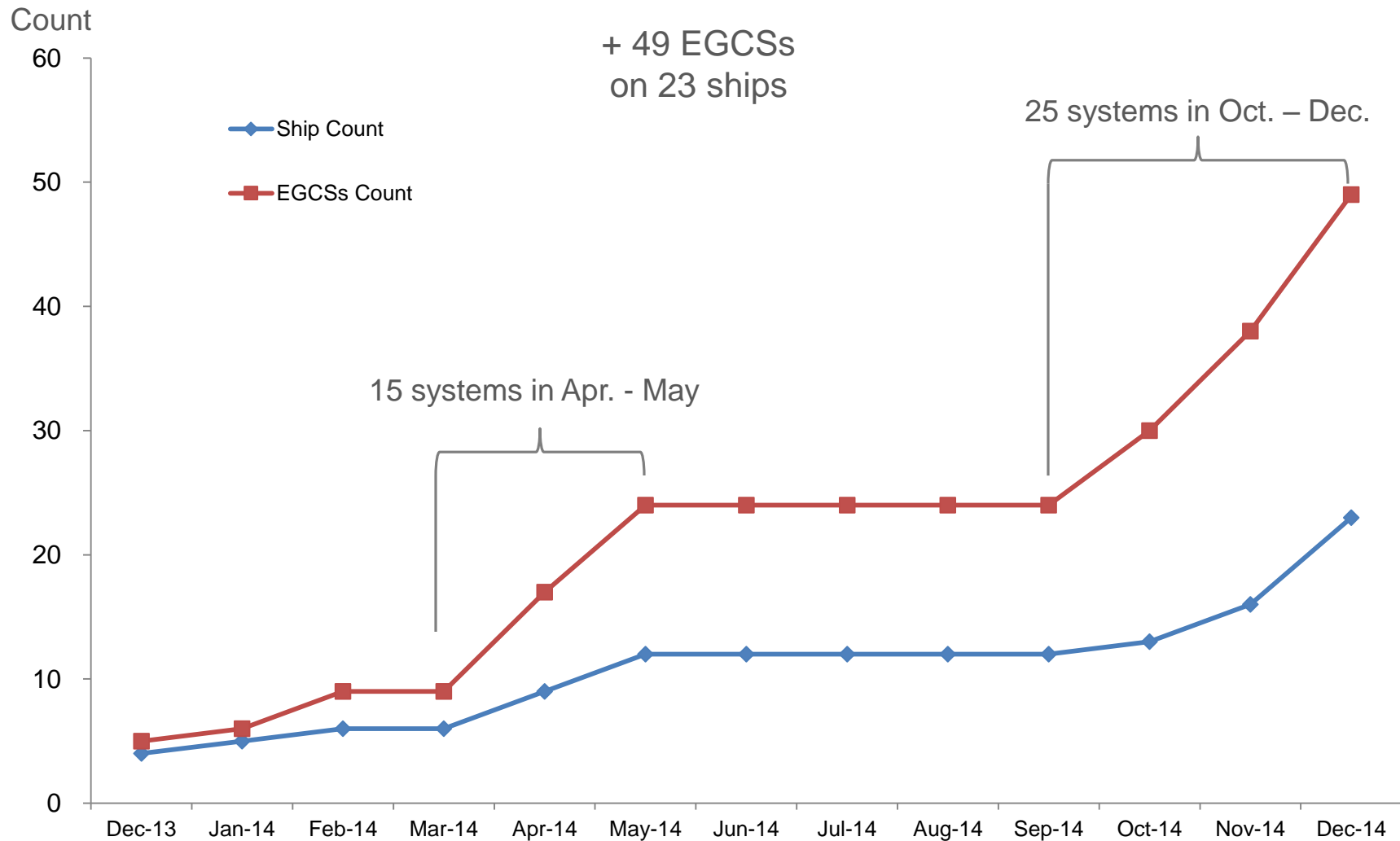


# Carnival EGCS (scrubber) program timeline

- **2006 - single engine/scrubber installation in HAL ZAANDAM:** Several co-sponsors, including US EPA, Transport Canada, Port of Seattle. Testing onboard continued until 2012.
- **2012 - decision to develop a system with exhaust filtration:** Installed first prototype on QUEEN VICTORIA in late 2012, commissioned in May 2013.
- **2013 - production installations in four ships in four shipyards:** GRAND PRINCESS, COSTA LUMINOSA, COSTA PACIFICA, P&O ARCADIA completed in four shipyards in November/December 2013.
- **2014 - full year installation schedule,** with 49 systems on 23 ships. Expectation is to meet a full 2015 schedule of 74 systems on 29 ships.
- **2014 - “in-service” installations,** with Carnival LEGEND and Costa FAVOLOSA.



# 2014 Carnival EGCS installation program



\* Based on dry dock installation date or beginning of in-service installation date

## Development progress includes:

- ***Eight tailored scrubber tower designs*** built and installed for Carnival refits to accommodate different engine sizes and onboard space available.
- ***Exhaust filter evolved*** to simpler, smaller, lower cost.
- ***New Demister*** designed for smaller size, higher performance
- Improved ***standardized control automation software***.
- Upgrade series for the ***Compliance Computer***.

## Some supporting activities:

- Initiated ***NorthAm ECA Exemption program*** with multiple ships.
- Ongoing ***meetings with EU and Transport/Environmental Ministries*** of 14 coastal member states regarding upcoming EGCS operations with open loop scrubbers.
- Agreement with global lab company SGS for ***fleet-wide washwater sampling, analysis and data collection program..***
- Engagement with ***Class Societies*** Lloyd's Register, RINA and DNV/GL to harmonize interpretation of statutory requirements.
- Engagement with ***USCG, EPA, State authorities and Ports*** regarding system operations.



# Shorepower



# Shorepower



**Long Beach**



# Shorepower



**San Diego**



**Vancouver**

# Shorepower



**Halifax**

