



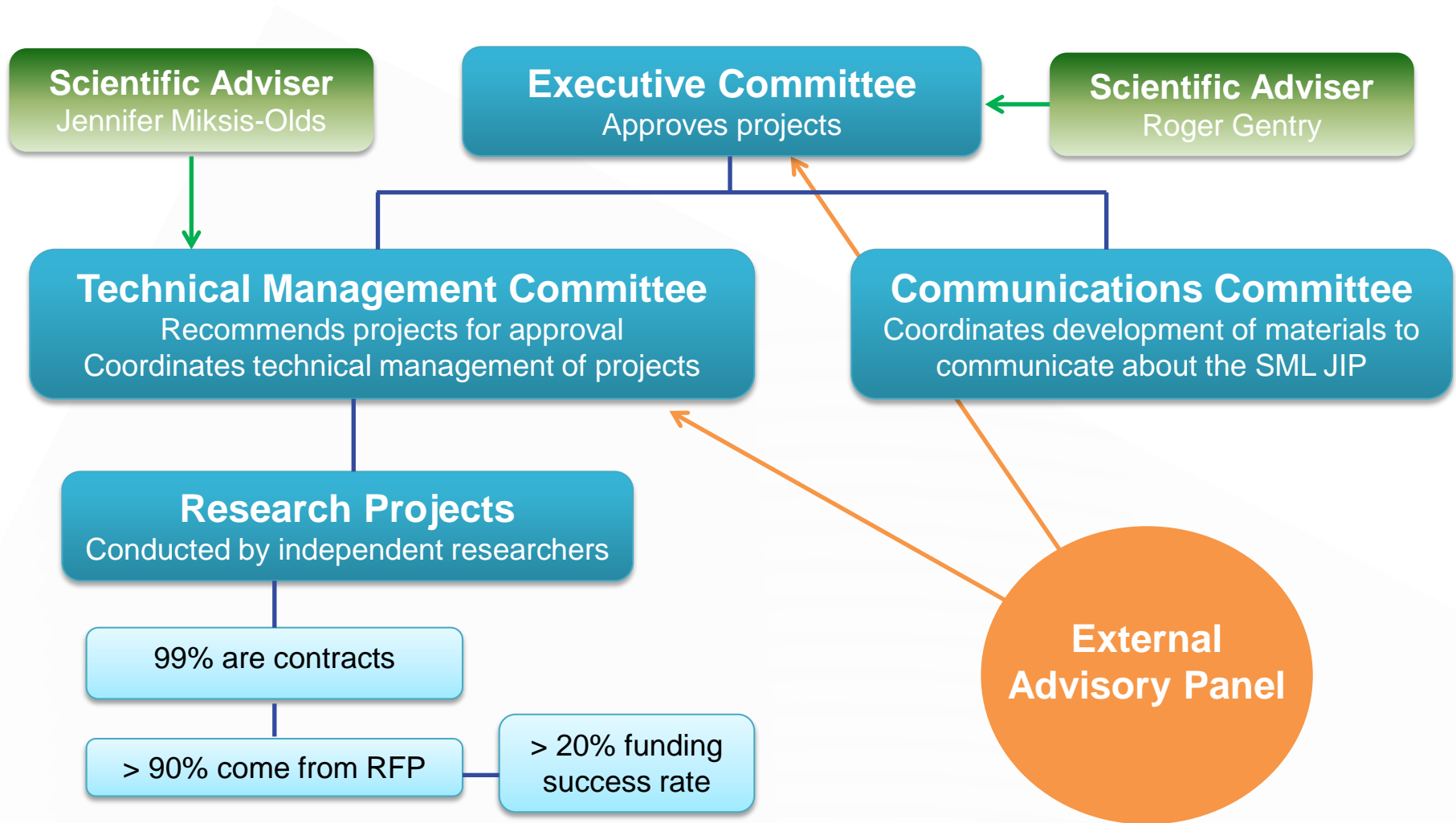
**E&P SOUND
& MARINE LIFE**
PROGRAMME

www.soundandmarinelife.org

Improving knowledge of underwater sound from E&P activities and its potential effects on marine life: An overview of a research programme

Paul Shone

SML JIP Structure



Part of the Sound & Marine Life Community

Frequent interactions

With NSF, ONR, LMR to leverage funding, NOAA, BOEM for funding partnerships and their data needs, U.S. Marine Mammal Commission to inform their oversight mandate.

Projects of interest to the whole community

PCAD, TTS (ONR)

Density Estimation method (NOAA)

Behavioral responses (BOEM)

Summary: The JIP is well integrated into the sound & marine life community

JIP Philosophy on the Value of Science

The JIP members firmly believe that effective policy must stem from good, independent science.

Advancements to understanding of the effect of E&P sound on marine life helps us all make better decisions and develop effective mitigation strategies as appropriate.



Partners in Joint Industry Program, 2014-2016

Total budget 2006-2016 ~ \$50MM

Amount available 2014-2016 ~ \$18MM



International
Association
of Oil & Gas
Producers



Statoil



BG GROUP 



ExxonMobil



Santos
We have the energy.



Ongoing projects

Source characteristics of a full airgun array

Final report due 2015

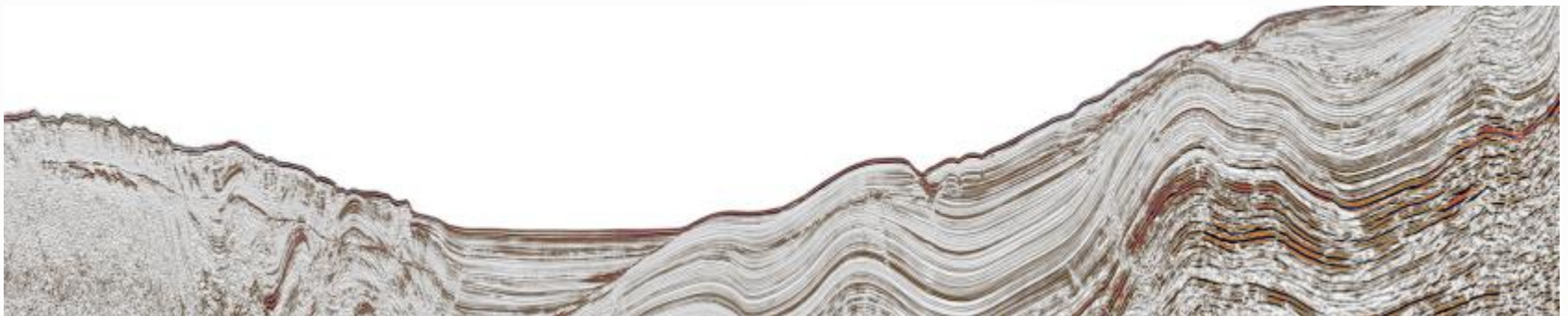
Source characteristics of single airguns and typical airgun clusters used in airgun arrays

Final report completed

Additional project analyzing data being developed

Propagation models available for industry use

Report drafted



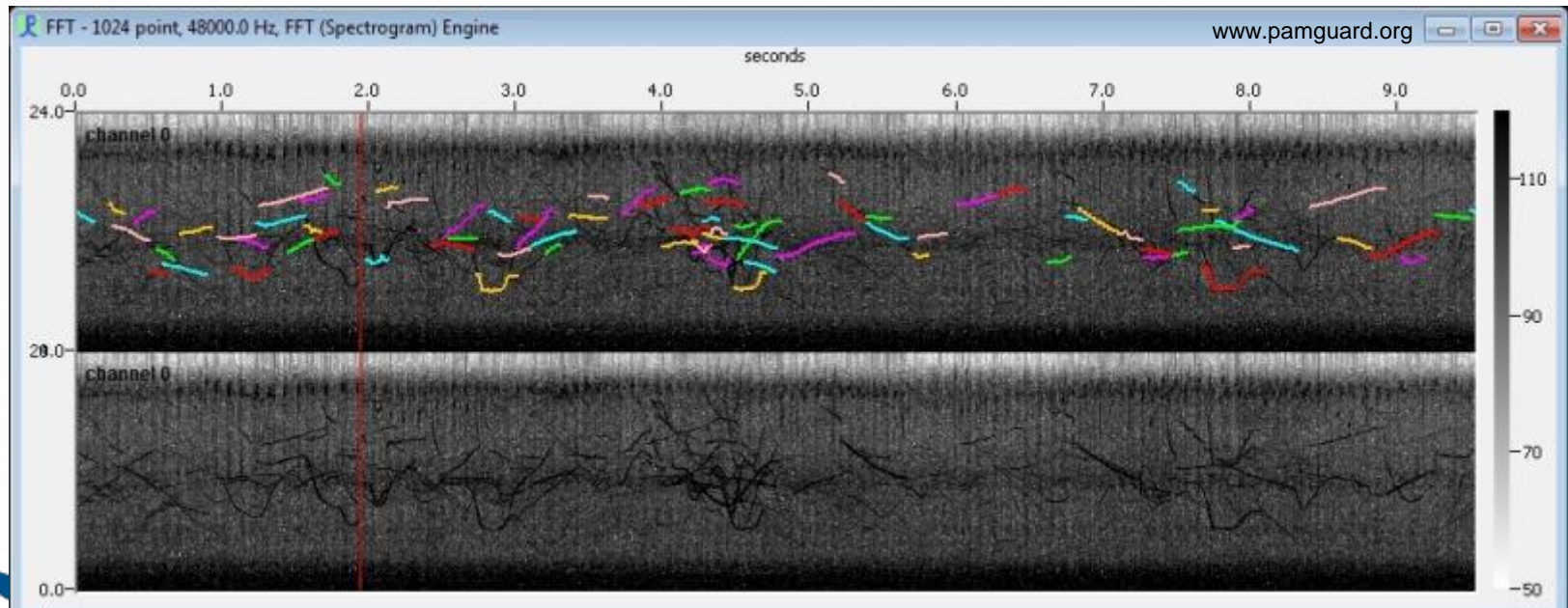
Sample Results & Products, 2006-2014

- Dolphins exposed to 10 consecutive air gun pulses at 195 dB re 1 $\mu\text{Pa}^2\text{s}$ SEL did not experience TTS (Finneran et al., 2015)
- New PCoD model of foraging in capital breeding seals (Costa et al., 2012)
- Air and water audiograms in spotted seal (Sills et al., 2014)
- Review paper on auditory masking in vertebrates



Sample Results & Products, 2006-2014

- Minke whale hearing model based on ear anatomy (Tubelli et al., 2012)
- Hearing ability in three life stages of loggerhead sea turtle (Bartol and Bartol, 2011)
- Statistical method for estimating cetacean population density from fixed PAM receivers (Thomas et al., 2010)
- Supported development of PAMGuard software system for passive acoustic monitoring of marine mammals (Gillespie, 2011)



Ongoing projects

Aerial and underwater hearing, and TTS from airguns in three species of Arctic seals

Review paper on auditory masking in vertebrates with a list of research needs for marine mammals

Responses of Australian humpback whales to sound from airguns and ramp-up using a full commercial array as sound source

Final Report due 2015



Phase III Projects

Support update to Southall et al. 2007 Noise Exposure Criteria for Marine Mammals using new scientific data since last review

Masking in seals from nearby and distant airgun operations

Population Consequences of Disturbance; an energy-based model on income breeding species and its application to sound impact assessment

Updated inventory industry sound sources

Comparing techniques and equipment for use in Low Visibility conditions

Phase III Projects – cont.

Auditory Weighting Function Expert Panel (RFP closed November 2014)

Hearing Recovery in Marine Mammals Exposed to Intermittent Impulse Sounds (RFP closed 27 March)

Literature review of Autonomous Aerial and Marine Technology Understanding (RFP closed 3 April)

Behavioral response of fish to seismic sound (proposal under review)

Long Term Fixed Acoustic Monitoring of Marine Mammals throughout the Life Cycle of an Offshore E&P Field Development (RFP just posted)

Topics Under Discussion

(Other topics to be discussed later in the program)

- Environmental assessment of marine vibroseis
- Test and Refine Propagation Models, Investigate Model Parameterization
- Mysticete hearing
- Masking
- + Others..



A new website

www.soundandmarinelife.org

A library with links to publications and reports from JIP-sponsored research

Details on research focus areas

Funding opportunities



www.soundandmarinelife.org