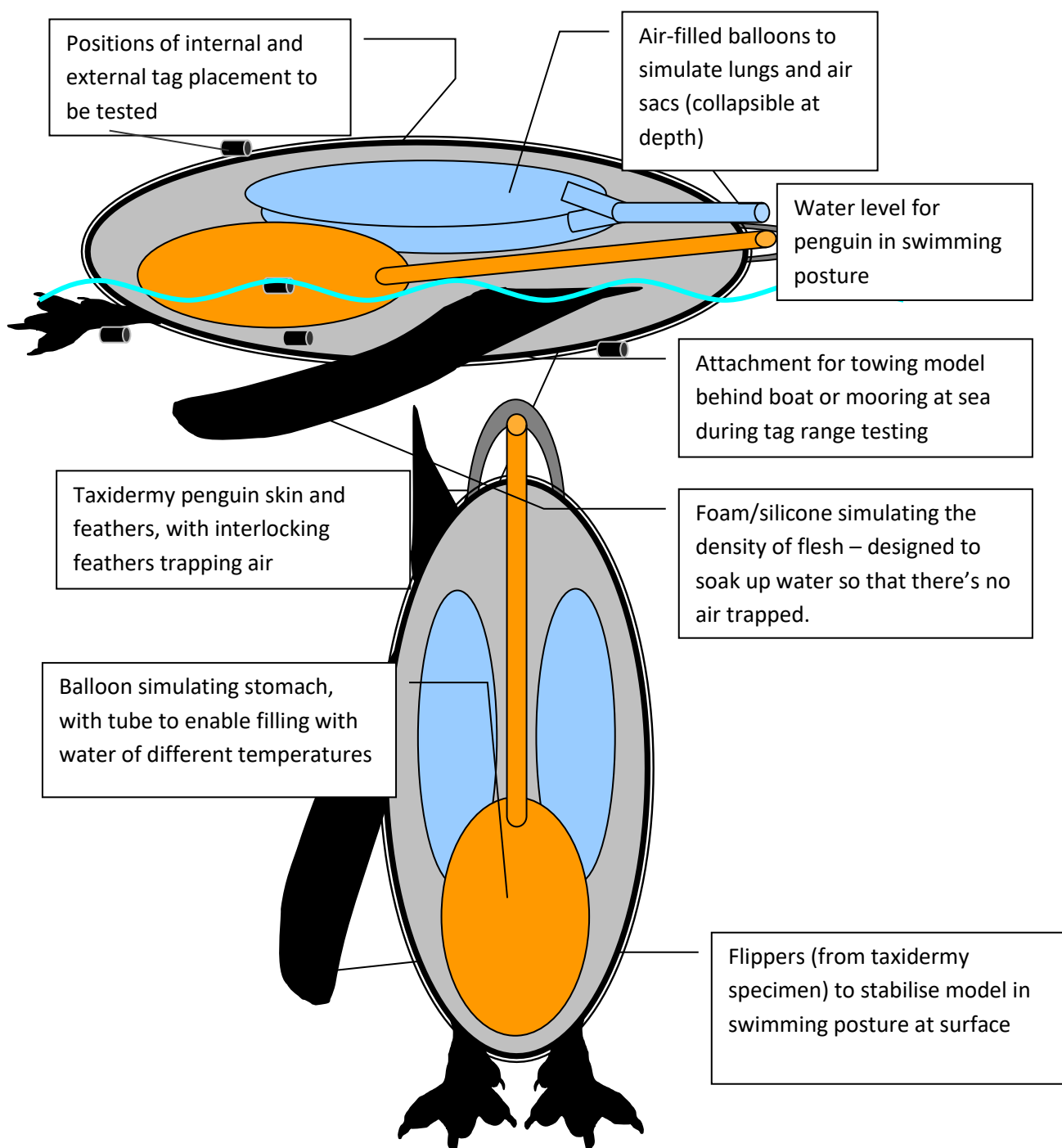


## Project Update: August 2013

### Penguin model for range testing in acoustic telemetry feasibility study

Range testing of acoustic tags will be conducted at sea (during different weather conditions) using a penguin model, with both external and internal tag placement. VR2 listening stations will be temporarily moored at sea in a line at 100m intervals. The range at which a VEMCO V9 tag is detected by listening stations will be tested and compared using the tag attached to the lower back, chest, or leg of a penguin model in a swimming posture (both at the surface and below the surface), as well as a tag inserted into the body cavity and stomach of the model penguin. This will provide an assessment of the effect of the air sacs and feathers/air/water interface on the strength of the transmitted signal of an internal tag.

A penguin model has been built according to the following specifications:



VEMCO acoustic transmitter tags have been purchased, with the following specifications:

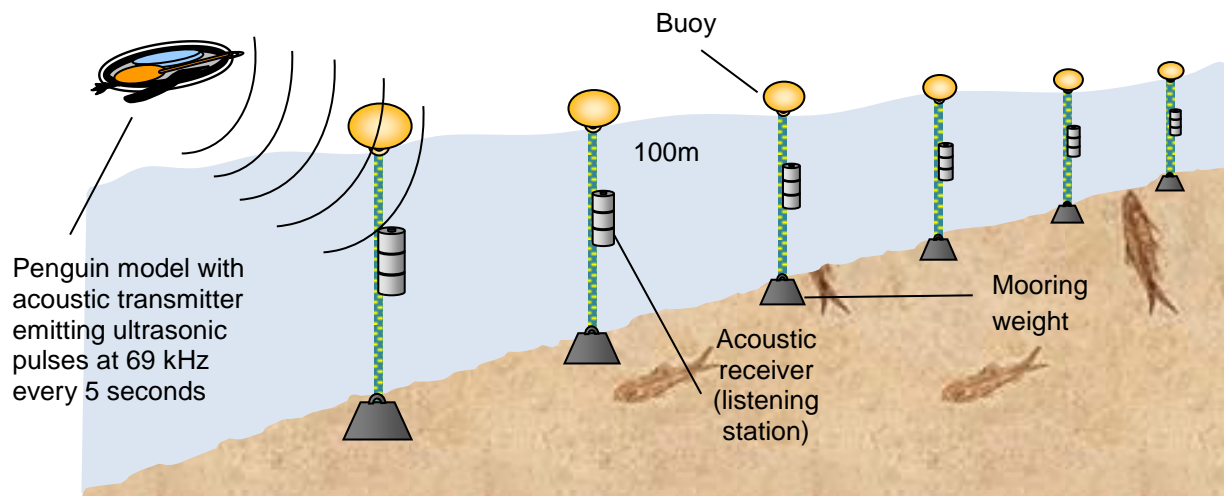
- **Range test tag V9-1H:**
  - Programming:
    - 1) ON 10 min, High power @ 6 sec (=100 pings)
    - 2) OFF 2 min
    - 3) ON 15 min, Low power @ 9 sec (=100 pings)
    - 4) OFF 2 min
- **Temperature test tag V9T-1H:**
  - temperature sensor (10 to 40°C)
  - no programming
  - fixed time delay: 10s
- **Behavioural test tag V9T-1H:**
  - no sensors
  - no programming
  - fixed time delay: 5s

The following tests will be carried out during the range test, scheduled for September:

- **Range test tag** at surface (simulating swimming penguin with external tag)
  - Attach tag externally to penguin model in swimming posture at surface
    - Attached to **lower back**, above water level
    - Attached to **chest**, below water level
    - Attached to **leg**, below water level
    - Tow model behind boat with tag attached to chest feathers – test water flow
    - Tow model behind boat with tag attached to leg – test water flow
- **Range test tag** inside penguin model/carcass (**simulating internal tag in penguin, to test signal transmission through body/feathers**) in swimming posture at surface
- Lower tag and CTD together – at <0.1m/s (tag/model 50cm above CTD)
  - Using **Behavioural test tag** – **test effect of depth on signal**
  - Using **Behavioural test tag** inside penguin model/carcass – test whether **signal transmission through body/feathers** is improved as air trapped in feathers/air sacs is compressed with depth
  - Using **Temperature test tag** – **test tag's temperature transmission lag**



Schematic representation of range testing of acoustic transmitter:



The number of pulses recorded by each listening station will give an indication of the range at which the transmitter is detectable. This will be repeated during different weather conditions, as well as with internal and external attachment of the tag.