data flow
Energy, information and bandwidth

Bernie McConnell
data flow

remote sensors
other tags
fish detector
RF data link

standard sensors
pressure
accelerometry
magnetometry
wet / dry

bespoke sensors
GPS
conductivity
fluorescence
dissolved oxygen
speed

controller

on-board processing

storage:
volatile,
non-volatile (SD Card)

transmission

other comms system
GSM / cell
Argos

A2d
Duty cycling
modeling dive duration

100 data points → 4 data points + timestamp
modeling dive shape

5 min dive sampled every 4s = 75 data points
= 4 inflection points
= 95% lossy compression
three state activity model

Compress data by relaying model parameters, rather than raw data

- **Hauled out**
  - Continuously wet for 40 s
  - Continuously dry for 10 mins

- **At surface**

- **Dive**
  - Deeper than 4 m for 8 s
  - Shallower than 1.5 m
data compression

data collected = 100 times Argos data bottleneck

100 data pairs
(200 bytes)

slope = 3.1
intercept = -1.6

2 bytes
slope = 0.8
intercept = 30
2 bytes

in order to use on-board modelling we must be confident, a priori, that the model is appropriate
sampling bias

• Satellite availability is intermittent and can be a function of behaviour. Therefore danger of relaying a biased sample of behaviour.

• Solution: pseudo random sampling from stored data.

Groups of 10 dive records

-48 hours  Now
data flow

rx, decoding & dissemination

Tag config ➔ rx

decoding

dissemination

Access ?

CTD: QC ➔ GTS

Sea Mammal Research Unit