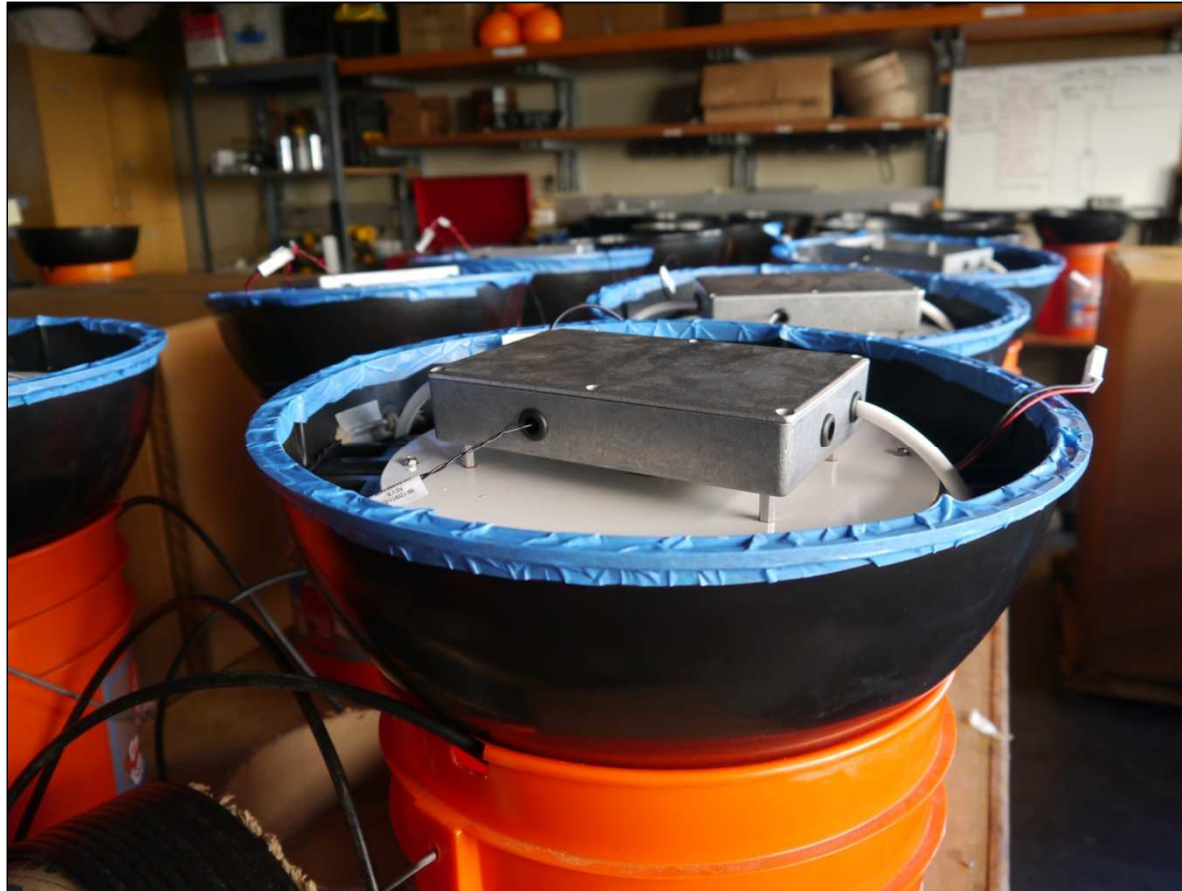




# 2014 Drifter Developments

at

Scripps Institution of Oceanography



By Lance Braasch and Luca Centurioni

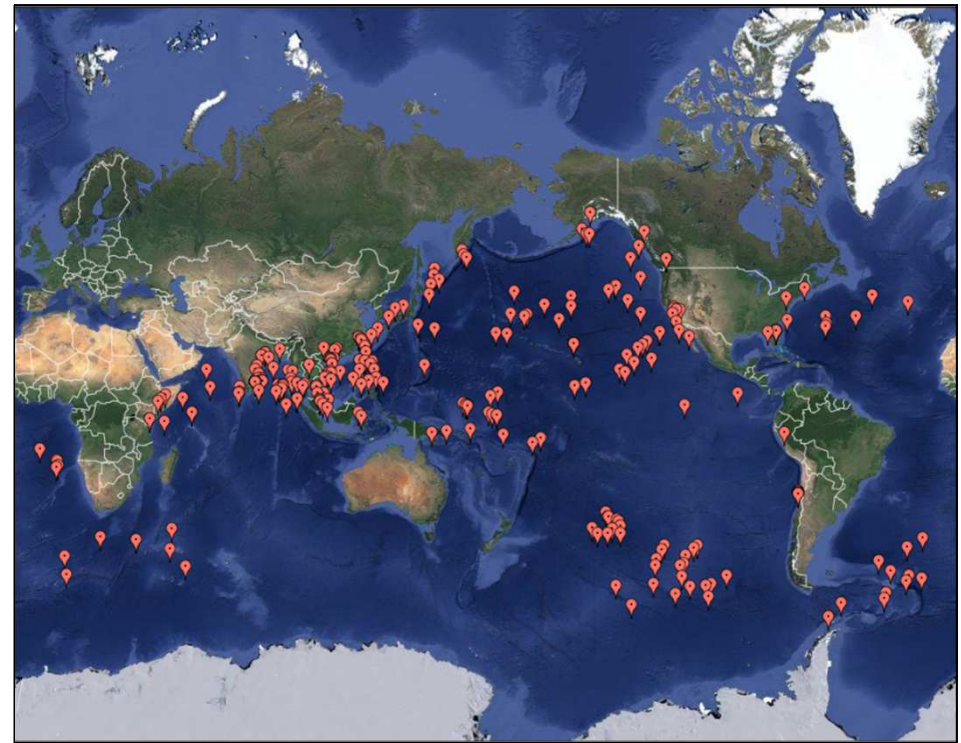


# Argos-3



## Summary of Performance

- Approx. 300 units deployed
- Projected lifetime: **+500 days**
- Irregular initialization and/or position fixes depending on region
- Need for **special care** during production



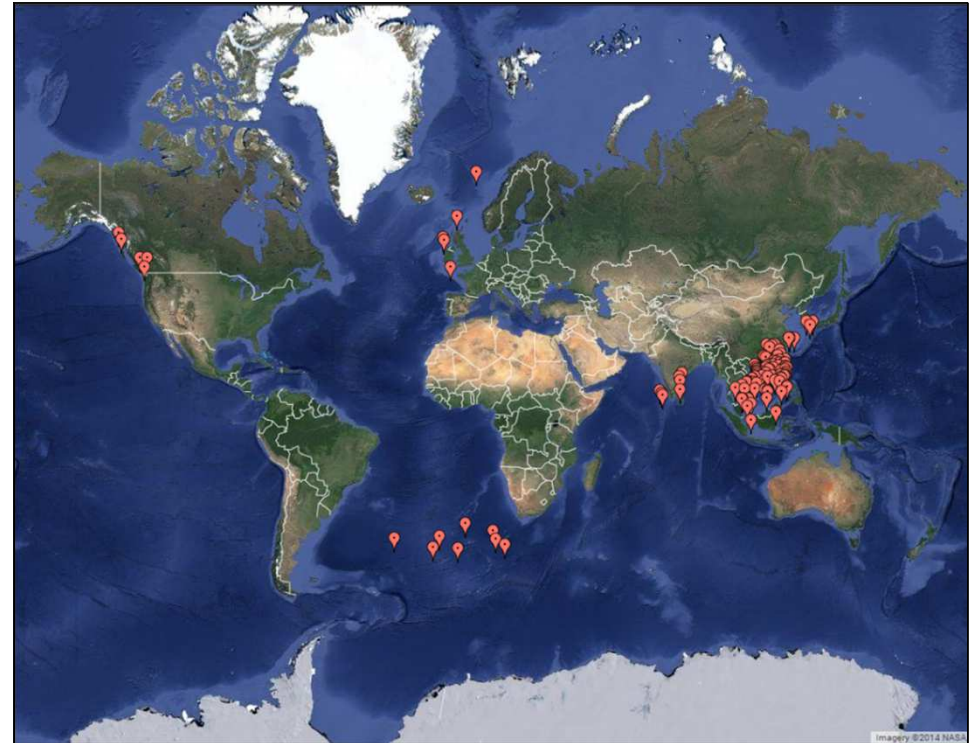


# Iridium



## Summary of Performance

- Approx. 100 units deployed
- Projected lifetime: **+500 days**
- Consistent GPS performance
- Potential for real-time drogue detection using RF diagnostic information

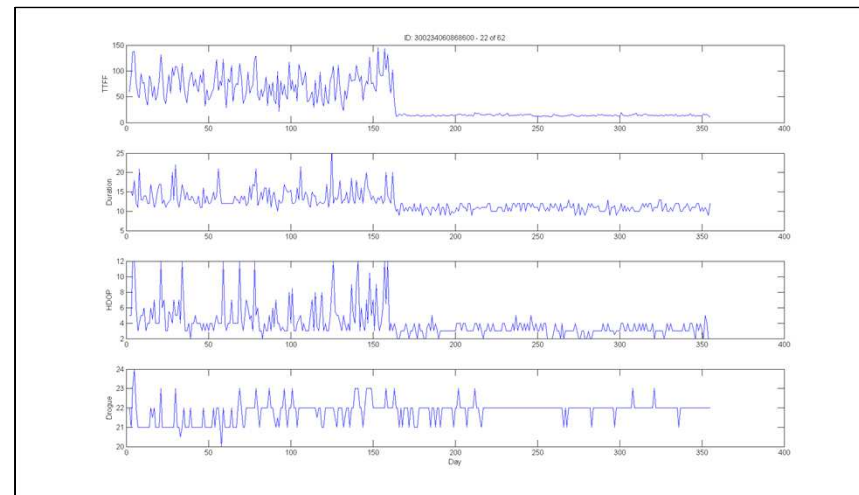
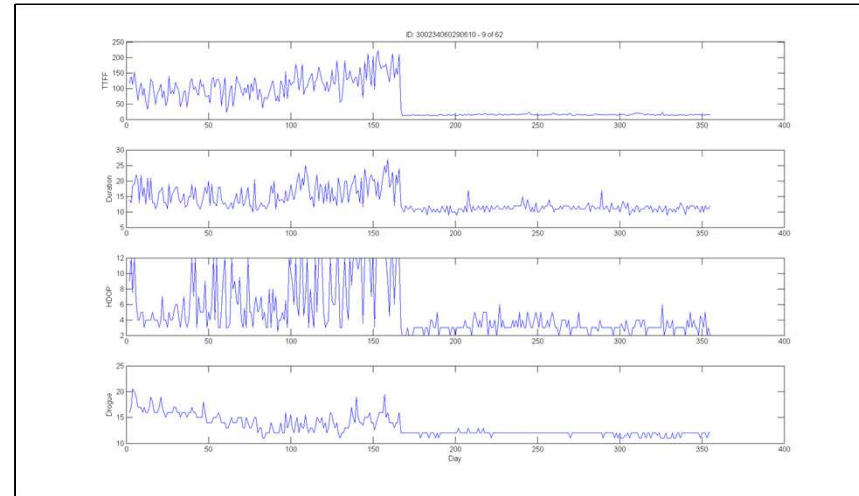




# Drogue Indicators



- Strain gauge
  - Prone to erroneous readings
  - Sensitive to sea-state
  - On/Off values specific to each platform configuration
- GPS Time to First Fix
  - Sharp edge without filters
  - Sensitive to sea-state
- GPS HDOP (Accuracy)
  - Sharp edge after filtering
  - Sensitive to sea-state
- SBD Transmit Duration
  - Sharp edge after filtering



From top to bottom: TTF, SBD Duration, GPS HDOP, Drogue

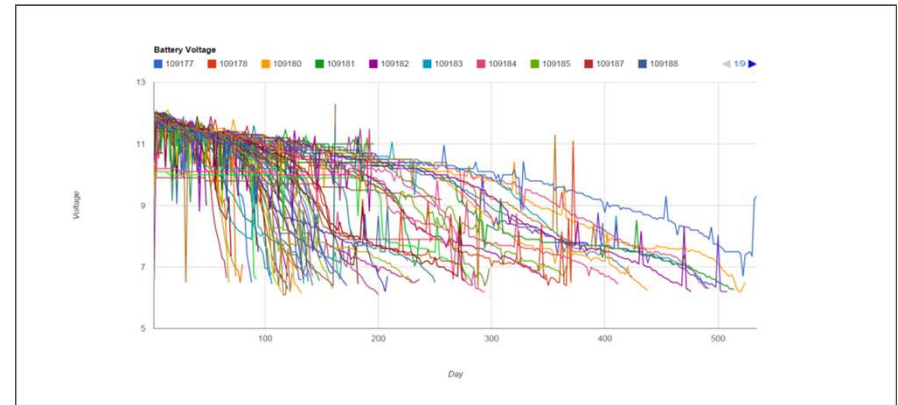




# Battery Performance

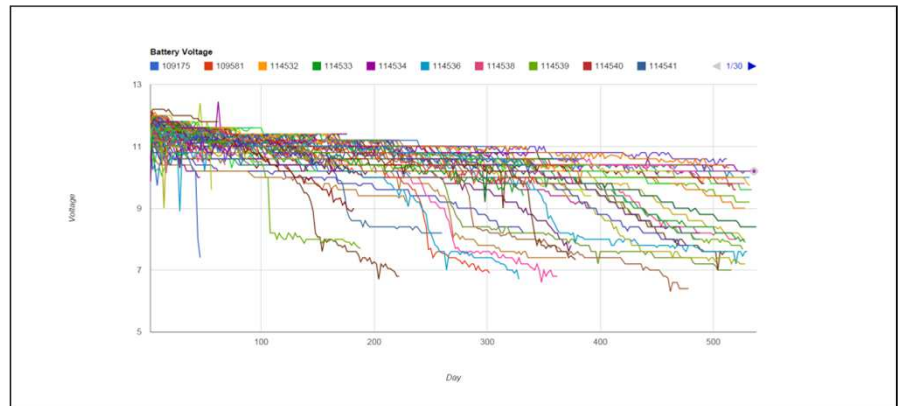


- Ruggedized Battery Packs
  - Approximately 400 drifters deployed
    - 25% Iridium SBD
    - 75% Argos-3
  - No longer see regular avalanche of battery voltage in first 180 days



Standard Battery Packs

- Strong increase in battery lifetime
  - Rugged packs **do not** prevent all battery pack failures
  - Migration to second generation methods for ruggedizing

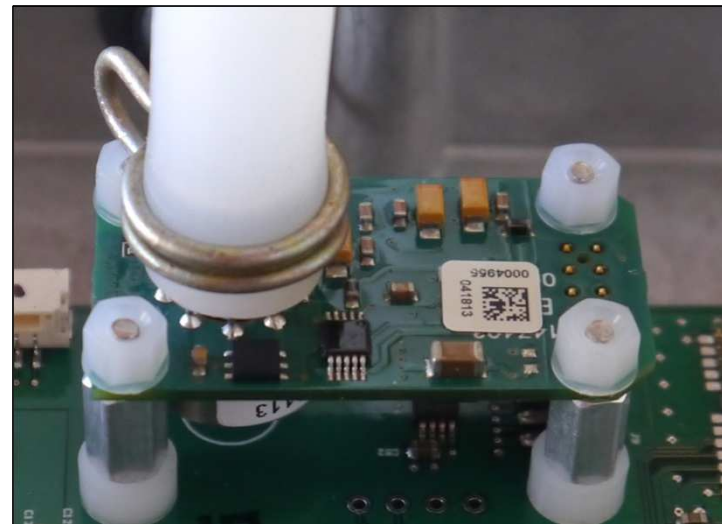


Ruggedized Battery Packs



# Developments

- New SIO controller for 2015
  - Latest generation components
  - Addition of diagnostic sensors
  - Overall **lower** power consumption
- Honeywell IPT Barometric Pressure sensor
  - 5 volt cutoff voltage
  - Available with same calibration and stability specifications as HPB
- GPS on **Argos** drifters
  - Reliable hourly position fixes
  - TFF and HDOP for drogue detection
  - Low cost add-on (<**\$30 USD**)





# Developments

- Diagnostic sensors
  - Float Humidity
    - Water intrusion
      - Failure of barometer plumbing
      - Failure of hull assembly
    - Tampering detection
  - Float Pressure
    - Improper sealing
      - During production
    - Failure of seals
      - While deployed
    - Monitor rate of hydrogen gas buildup from battery outgassing
    - Tampering detection
- Low cost and low power
  - $< 0.5\text{mA}$  peak power draw
  - $< \$8$  USD per board





# Iridium Server and GTS



- Real-time processing of over 5,000 SBD transmissions per day
- Pushing data onto the GTS
  - BUFR format
  - Latency <15 minutes
- Collaboration with AOML for WMO assignment and QC monitoring
- Redundant server racks running parallel for data integrity

