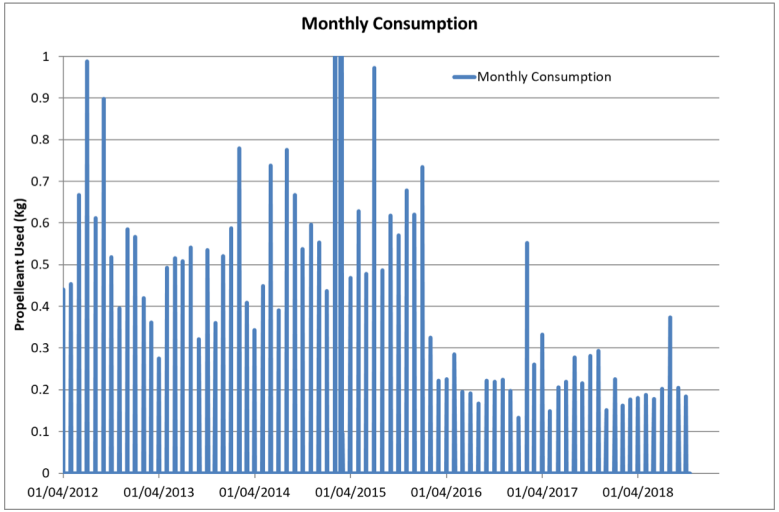
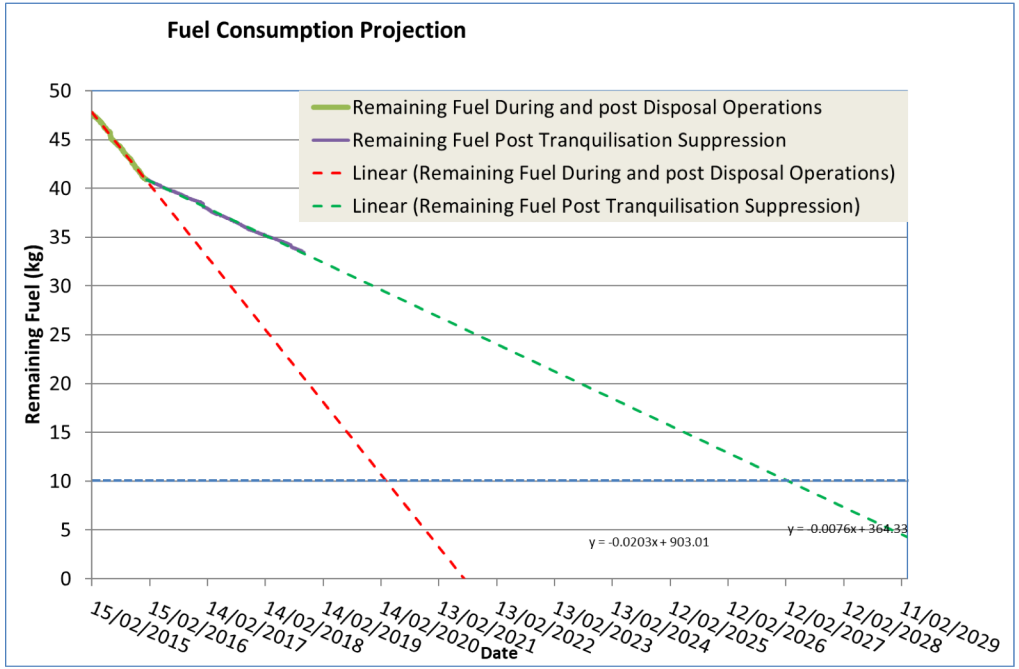
Propellant Usage and Predictions





Remaining 17/10/2018: 33.4kg

- Usage 2014: 6.7kg!!
- Usage 2017: 3.2kg
- Usage over last year 2.53kg
- Expected 2019 onwards: ~2.2kg
- Effects of disposal manoeuvres fully compensated
- => Propellant will probably not be exhausted before re-entry

Array Degradation

From IUG 19

Action 19–3 on RS Due: end 2017

Prepare Technical Note on options for Eclipse Entry handling when array currents approach critical threshold.

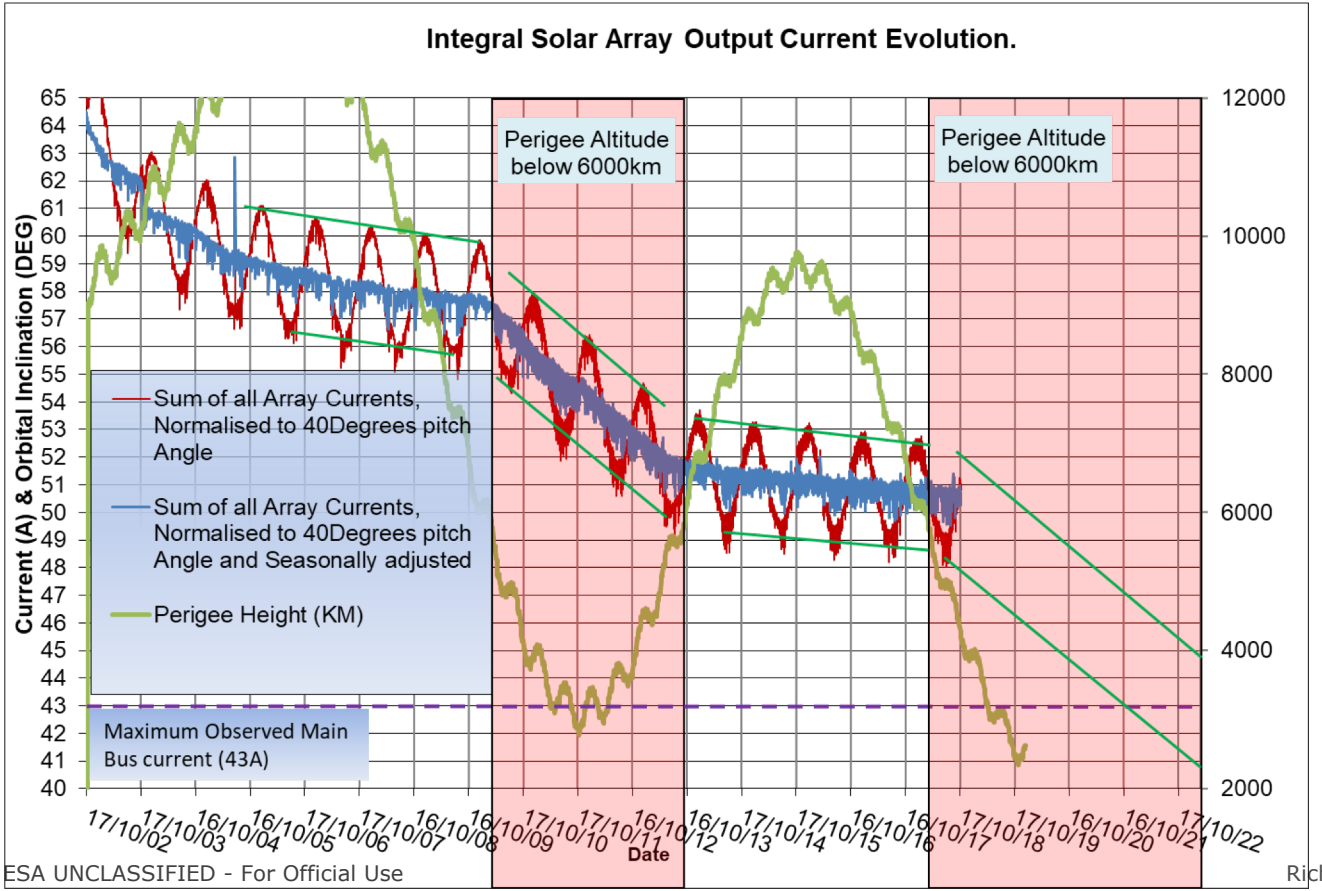
2 issues:

- Power Budget evolution
- Autonomous reconfiguration ECL(s/e) at eclipse entry may occur in sunlight at high pitch angles => unplanned instrument switch-off

TN not yet updated but clear strategy proposal for both issues

Exact timing is tbd, depends on further evolution

Array Degradation – Power Budget



Short duration peak power demand (10min)

EPS limits battery charge in case of excess demand

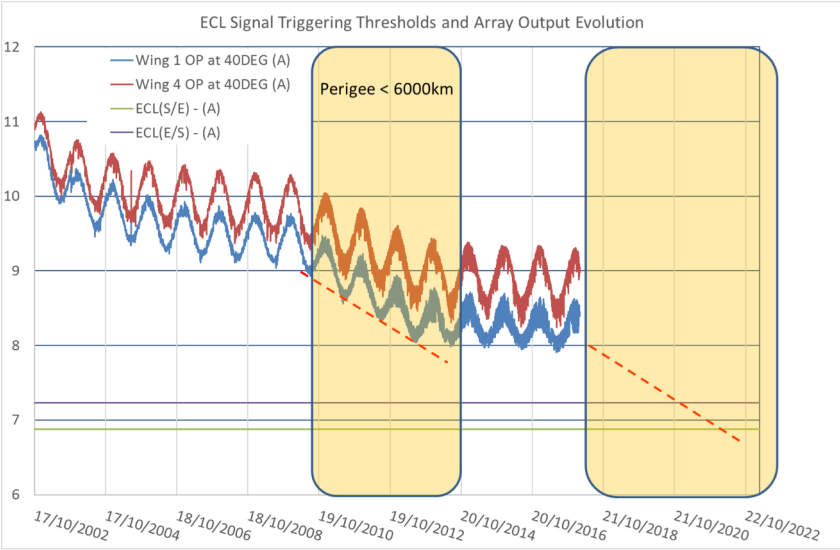
- Flexible margin of about 6A
- Occasional reduction in charge rate from 2021
- Mitigated by:
  - Long recharge time between eclipses
  - Low Depth of Discharge

Limited discharge in sunlight allowable – **we know the batteries are healthy**

No power constraints expected before end 2022

Constraint only when discharge in sunlight is significant

Array Degradation – ECL (s/e)



The ECL Issue

- Autonomous reconfiguration at eclipse entry
- Based on array output I (Fixed threshold 6.9A)
- Reconfiguration for power (safety) reasons
- Approaching threshold at max pitch angle in sunlight
- Powers off PLM units unexpectedly – long recovery!
- Not before 2020

The proposed solution

- Limit pitch angle to in eclipse season only, disable ECL(s/e) outside eclipse season,
  - Initially limitation to 35DEG is sufficient, later 30DEG
  - Ensure safety with OBM entry to re-enable ECL(s/e) signal at anomalously low array output (5A tbc)
  - Temporary loss of part of celestial sphere visibility for about 90 days / year

Start depends on observed degradation

Study of observed and predicted array degradation initiated

SPI Status

29/10/2018 02:14 Multiple single EDAC error messages received

- Memory corruptions on 2 neighbouring locations
- 29/10/2018 07:49 The DPE crashed, possibly double memory error

29/10/2018 17:36z Multiple single EDAC error messages were received again.

- Memory corruptions on 2 neighbouring locations
- 29/10/2018 21:31 The DPE crashed, possibly double memory error

31/10/2018 17:22z Further SPI reset commanded - Not responding after tests

1/11/2018 13:40z SPI Returned to science - VETO Spectra generation disabled

SPI Operating nominally again from MOC operations point of view

Further diagnostics / test plan will be issued

- Disable reset after double memory error detection?
- Memory Patch?
- Leave as is?

SDPE 2 basic functionality checked out after 16 years!

- Boot, HK data, TC, basic physical health