



Effectiveness of Contingency Flights

William T. Reach

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Completeness: SUG Questions [1/2]

- How many projects lost data to lost flights?
 - *In Cycle 4, there were 10 programs that lost time due to lost flights that were not recoverable.*
- How many projects profited from contingency flights?
 - *19 GO programs profited from the 4 contingency flights in Cycle 4 (OC4B: 6, OC4D: 6, OC4I: 4, OC4K: 3)*
- In which cases can contingency flights can replace lost flights, and when that is not possible?
 - *One-offs can be replaced; consecutives cannot [see following slides]*



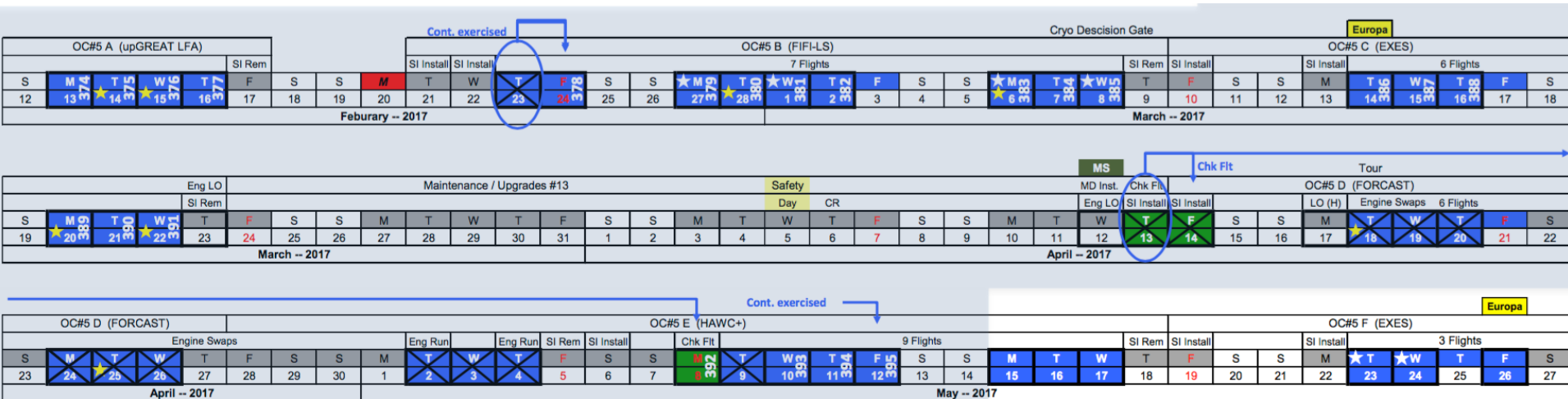
Completeness: SUG Questions [2/2]

- What kinds of "show-stoppers" may be in the way of having a contingency flight?
 - *For planned/scheduled contingency days*
 - *Some flight plans do not switch dates readily due to 4 min/day effect of Earth's motion around Sun [sunrise/sunset/Moon]*
 - *Non-sidereal targets not always moveable [satellites]*
 - *For unplanned/added recovery requests*
 - *Same constraints as listed above, PLUS*
 - *key staff not always available*



Cycle 5 Contingency flight usage

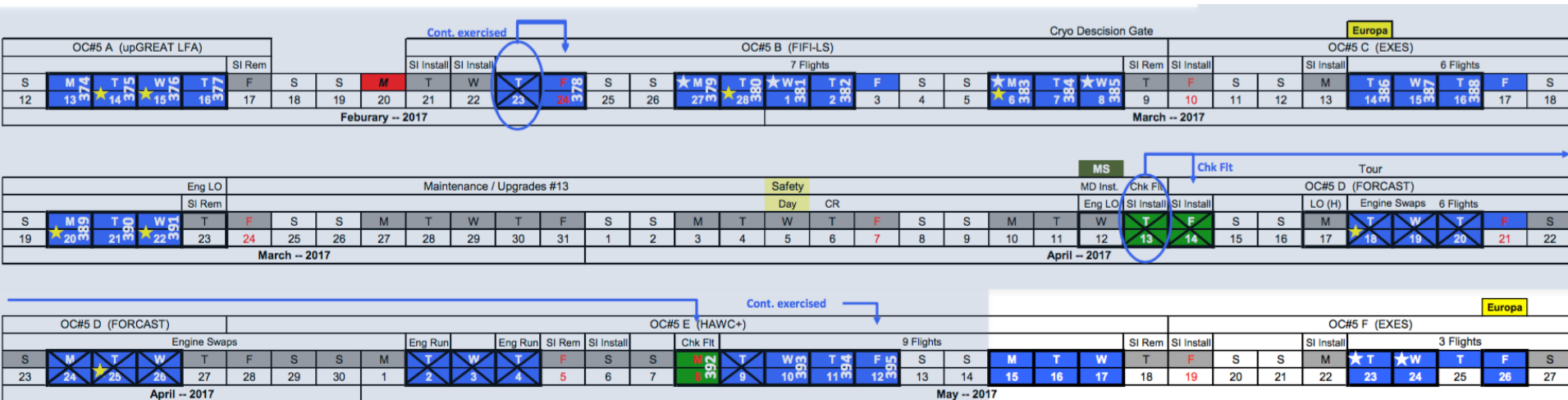
- On 2/23/17: flight lost
 - Used scheduled contingency opportunity for 2/24/17
 - → *flight saved*
- On 4/13/17: 11 straight flights lost [2 engines swapped]
 - Scheduled contingencies could not accommodate
 - → *10 science flights lost*





Cycle 5 Contingency flight usage

- On 4/15/17: flight lost
 - No remaining contingencies in HAWC+ series
 - Attempted shuffle to use 5/25/15 scheduled contingency
 - Lack of Flight Engineer for the requested new 5/18 flight as an unplanned contingency
 - *flight lost*





Contingencies

- What works:
 - Single-flight losses during series with scheduled contingency afterward in same flight series
 - Saved 4 flights in Cycle 4 (OC4B, OC4D, OC4I, OC4K)
 - *Current contingency strategy works for one-offs*
- What doesn't:
 - If contingency is used and a second flight is cancelled that would have used that contingency date (OC4D, OC4I)
 - Multiple-consecutive-flight losses would require a type of contingency schedule that is incompatible with fixed, rotating schedule of science instruments (OC4E [6], OC5D+E [10])
 - *Alternative plans for contingencies for long outages is inconsistent with a staffing plan for ground crew, flight crew, celestial targets, rotating science instrument schedule. They are nonetheless under study*



Science impact of Lost flights: Cycle 4

- Cycle 4 completion summary

Status	# Projects	Note
Complete	61	More than 80% time or Instrument scientist deems no more needed
Partial	2	Impact Programs (multi-cycle)
Incomplete	9	Partially observed, not carried over (7.5% of GO science flight hours)
Not started	29	
TOTAL	101	

- The impact of the lost flights in OC4E is primarily not-started observations that needed Southern time with GREAT





Science impact of Lost flights: Cycle 5

- The complete loss of series OC5D (FORCAST)
 - eliminated spring targets for FORCAST, including:
 - Two comets (from the same proposal)
 - Jupiter spectral map
 - we informed the affected GOs so they could repropose in Cycle 6
- The loss of half of OC5E (HAWC+)
 - *(Series just ended; preliminary assessment; 5 of 10 flights)*
 - Prioritized and accomplished key goal
 - image of galactic center polarization
 - Inner galaxy projects very incomplete
 - Several scheduled projects not observed at all



SUG Feedback

- Are there measures planned/possible that could reduce show-stoppers for contingency flights?
 - *Increase redundancy of flight-critical staff*
 - *ground crew, flight crew, mission and science ops crews*
 - *Improved flight-planning tools (Short-Term Scheduler) can now provide relatively rapid feedback on replans*
- Are there things that the SUG could recommend to put resources to possibly increase proposal completeness (vs. may be better to have these resources in other fields, like data pipeline)