

MICE Resource Loaded Schedule Review May 7th & 8th 2013

Report for the MICE FAC, May 10th
Professor Ian Robson

The 'Charge'

- Complex set of words, but fundamentally it was a review looking at schedule in the face of risk and funding restrictions.
- Panel members:
 - Ian Robson (STFC) Chair
 - Steve Peggs (BNL)
 - Tom Taylor (CERN)
 - Steve Meador (DOE)
 - Ron Prwivo (BNL)
 - Charlotte Jamieson (STFC) in attendance
 - Bruce Strauss (DOE) in attendance

Operation of the Review

- There were 14 presentations by the project team, ample time was available for questions and discussions and a couple of 'homework' questions were given for answering on day-2: both were done well
- Tour of R9 and the MICE Hall
- The Report has been written and the project was given feedback at the end of the Review

The MICE Project

- MICE is an R&D project that seeks to test the concept of muon-beam cooling as a precursor to potential major downstream programmes of muon accelerators/colliders and a neutrino factory
- Originally conceived as being delivered in six 'steps'; when first funded in 2005 the final step was scheduled for 2013
- However, project delays resulted in Steps II and III being omitted and these measurements will be done in Step IV
- Step IV is the first time the fundamental equipment will be brought together in the MICE Hall at RAL and is a major milestone; a go/no-go stage for proceeding to Steps V & VI.
- MICE is a collaboration between a number of countries/agencies but by this stage the UK and US are the major players in the construction phase

What's changed?

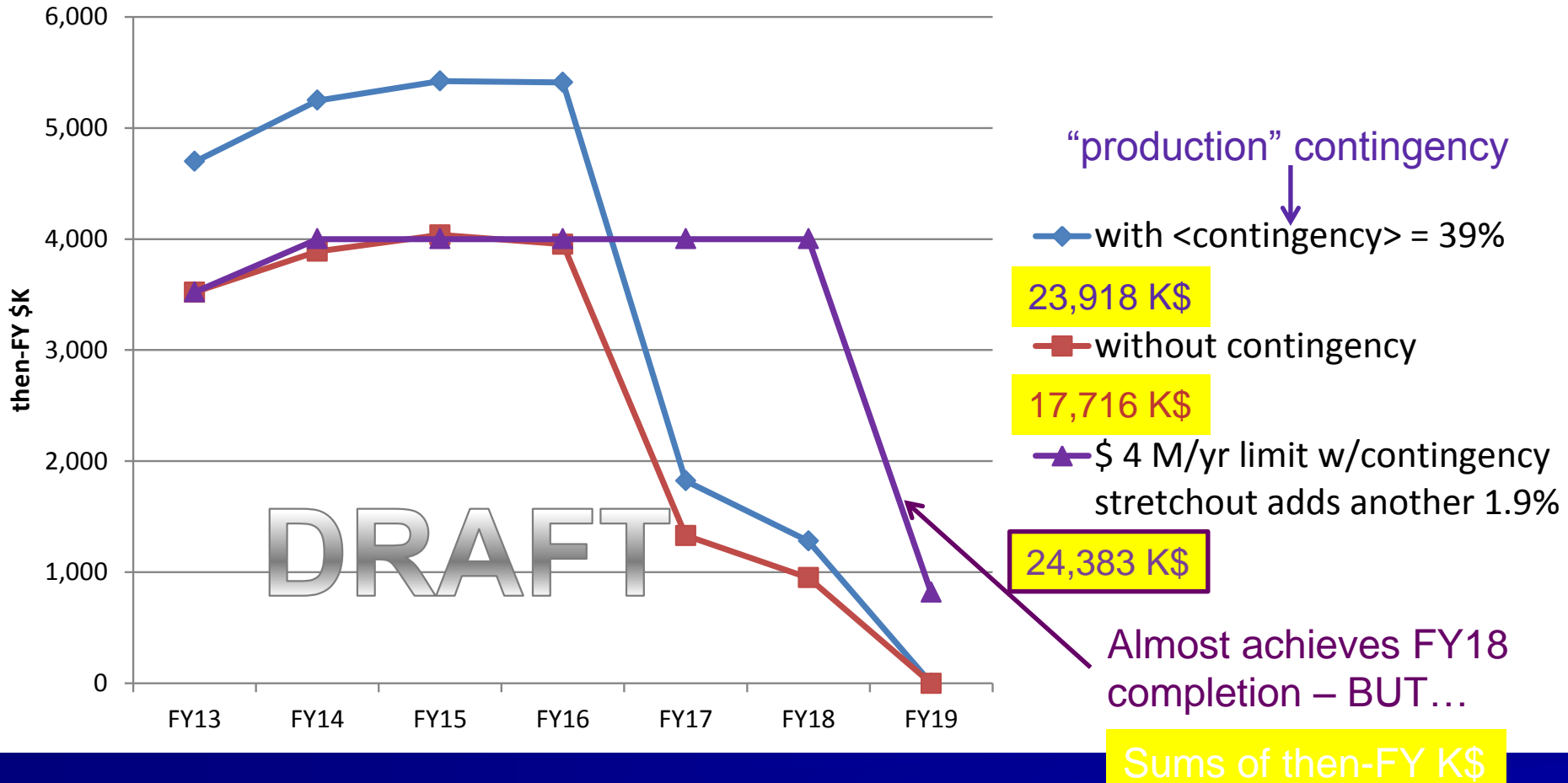
- Over the last year significant progress has been made on technical items and risk reduction
- The 'projectization' of MICE within MAP has been very beneficial for a variety of reasons
- MAP was awarded additional resource by the DOE because of the programmatic priority and importance and MICE has been successful in obtaining a significant funding uplift
- The US project team has been able to address the level of contingency likely for the project and has fed this into schedule projections

The impact

- The ideal solution to deal with technical risk is to front-load the project to mitigate this as soon as possible.
- However, this was not possible within the overall funding envelope and the resulting flattening of the spend profile is to push the schedule out.
- The end of the project on this scenario is pushed out to the 2020/21 period with a subsequent increase in cost-to-completion over previous estimates.
- Both these conclusions are expected to be more realistic given the technical risks yet to be retired.

Now Add Contingency and Stretch

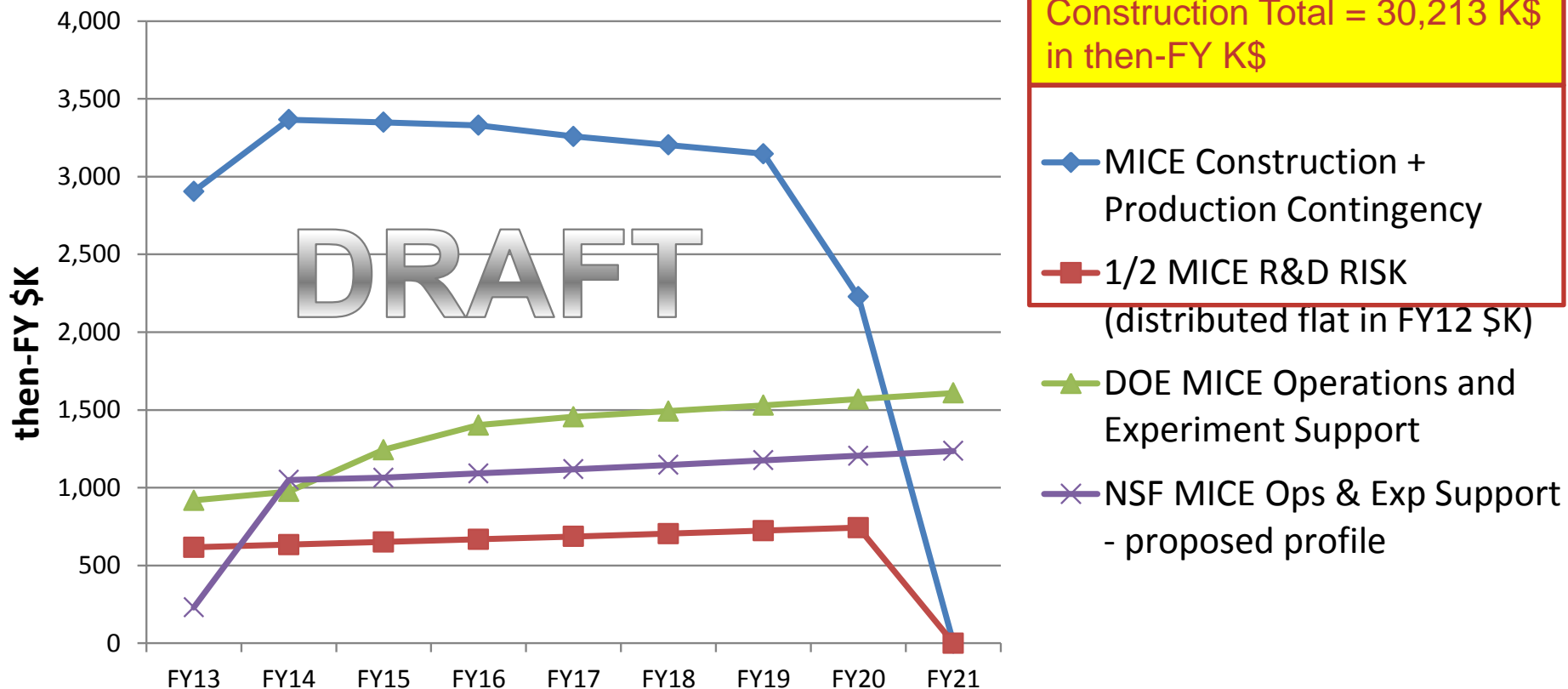
US MICE WBS 5 Production Costs



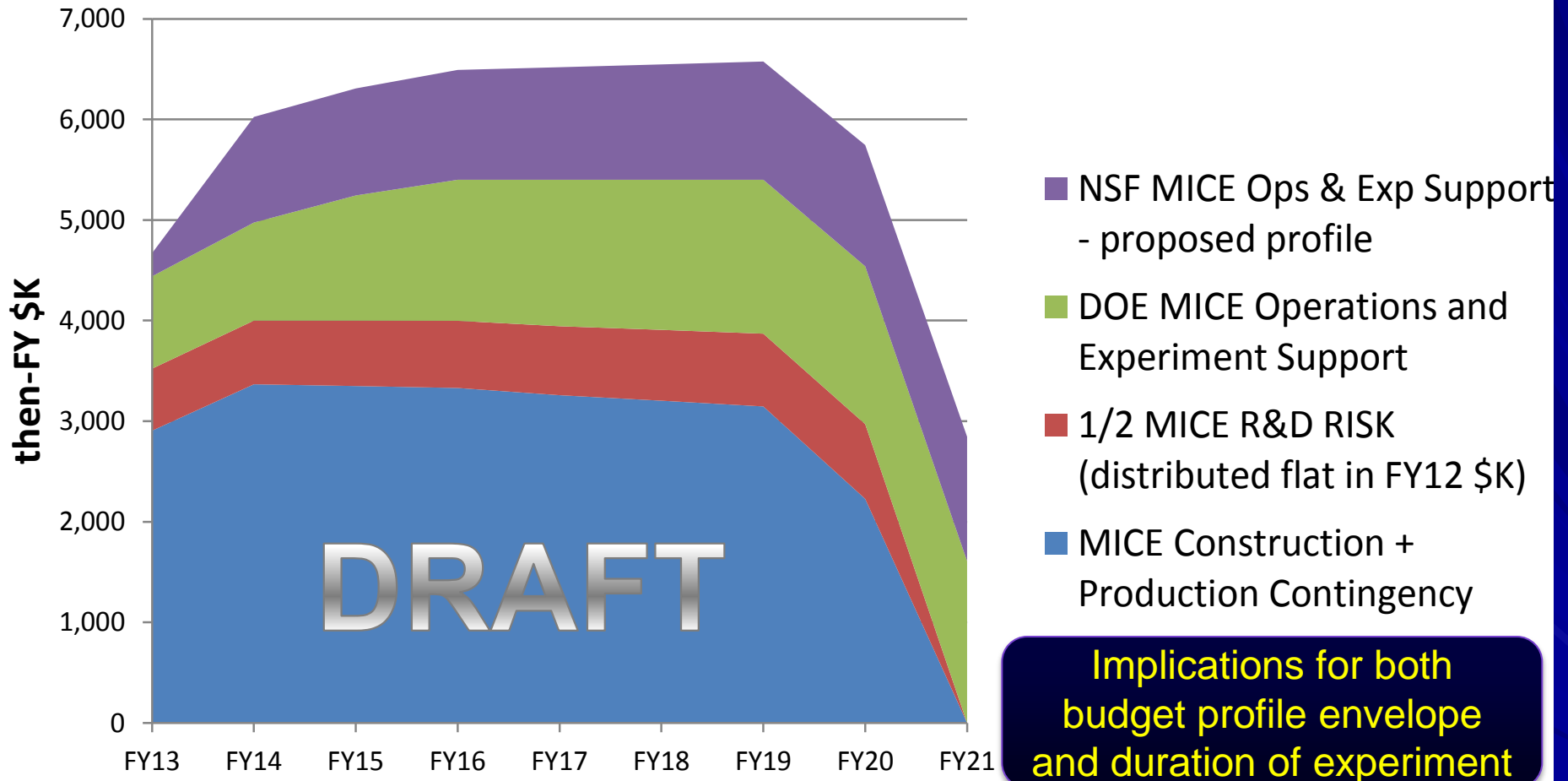
US Program Subject to R&D Risk

- US Risk Register: ~\$10M of active R&D-related risk
- Plot also shows funding concept for experimental effort to ensure success (further collab/agency discussion needed)

US MICE Funding Profile



Under These Assumptions...



Note: no approved NSF Funding for Ops & Exp beyond FY13
DOE Operations & Experimental support still under development

The Schedule

- The ISIS long shutdown will start in August 2014
- MICE will not be in a position to take data before this time
- Therefore, there is around five months of 'slack' in the schedule to be ready to start data taking in Step IV in Feb 2015: this looks to be a date that can be taken with some degree of confidence
- The current top-level schedule has Step V taking place in September 2017 and Step VI in May 2019
- Little confidence can be placed on these dates at the current time given the remaining risks and funding constraints

Organisation

- The project has recently formed a MICE International Project Office (MIPO) for the construction phase.
- This should be the management vehicle that sees the project through to a successful conclusion – supported by the Review, but work in progress.
- Two clear decision points have been identified in terms of dealing with the stray magnetic fields in the Hall and surroundings:
 - Sept 2013 for Step IV
 - June 2015 for Steps V & VI
 - Also for other decisions

Outcomes from the Review - Recommendations

- Develop a risk-cost-benefit decision tree that shows how decisions regarding performance/cost-schedule trade-offs might be taken, for the next round of oversight meetings in the autumn 2013.
- Complete the financial analysis presented in the meeting of the savings of not proceeding beyond Step V by the autumn.
- Perform a cost-benefit analysis to support the final decisions on potential delays to key staff appointments by the autumn.
- Establish a set of criteria for the demonstration of the successful conclusion of Step IV for the autumn.
- Update the project schedule to present the best, most probable and worst-case dates for Steps V and VI by autumn.
- Identify a set of appropriate intermediate milestones as a means of monitoring and reporting progress by autumn.

Outcomes from the Review – Actions

- Undertake an analysis of the cost of risk mitigation to the same level on both sides to determine the potential impact on schedule and cost-to-completion by the autumn round of meetings in 2013.
- Identify and recruit appropriate external specialists as members of the review panel assessing the stray magnetic fields in the MICE Hall that will be held at RAL in August/Sept 2013. Planning for the review should be starting now.

Outcomes from the Review – Recommendations for the Funding Agencies

- Analyse the re-profiling of allocation between financial years for specific items in order to maintain schedule, by October 2013.
- Clarify the timeliness of the MICE project outcomes within MAP and the future muon programme in the US, by autumn 2013.
- Re-examine the availability of funding for the MICE project in the UK in light of progress and developments on the US side.