

HL-LHC UK Contribution

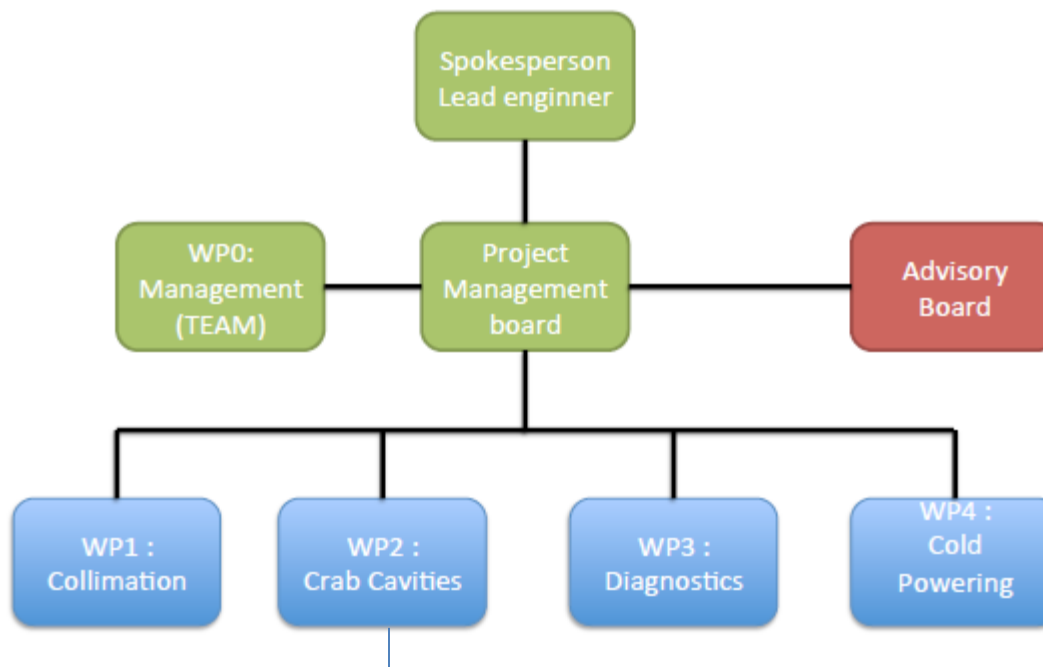
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UK-LHC Kick off meeting

May 26, 2016, CERN

<https://indico.cern.ch/event/533058/>

HL-LHC UK Contribution



Chapter 5 — Work Package 2: Crab cavities

This work package focuses on the crab cavities for HL-LHC, which collision in the presence of a crossing angle. The proposed work, an divided into 3 tasks

1. Task 1 : Testing crab cavities at SPS
2. Task 2 : Design and assembly of the pre-series prototype
3. Task 3 : Beam dynamics and RF noise studies

STFC Funding for WP2/ Task 2

Goal - to deliver a Pre-Series CM for HL-LHC

Duration 4 years

Start - April 2016

End - March 2020

Funding : 3 sources

(FTE)	PM/ Cryo	TD/ Engg	ETC/Technicians	Other	T/S
STFC	x	1.73	2.79	371430	4822
ASTeC	1	x	x	x	1188
CERN	1	1.73	2.79	371430	6000
Total	2		8.04	742860	12000

Additional funding has also been awarded to ULAN

Scope (as stated in the bid)

In collaboration with CERN

1. Thermal modelling and design of the thermal shield
2. Magnetic shield analysis and design
3. Stress analysis of all components
4. Produce full set of cryomodule drawings
5. Manufacture of all components
6. Assembly of the cryomodule at Daresbury and thermal cycling tests
7. Shipping to CERN and final testing at CERN

WP2: Crab cavities

Table 5.4: Deliverables for 1.1.

Number	Owner	Due date	Format	Description
D2.3	STFC	M30	Drawings	Design of a pre-series cryomodule for HL-LHC crab cavity
D2.4	STFC	M48	Hardware	Production of a pre-series cryomodule for HL-LHC crab cavity

WP2: Crab cavities

Original Schedule submitted with bid

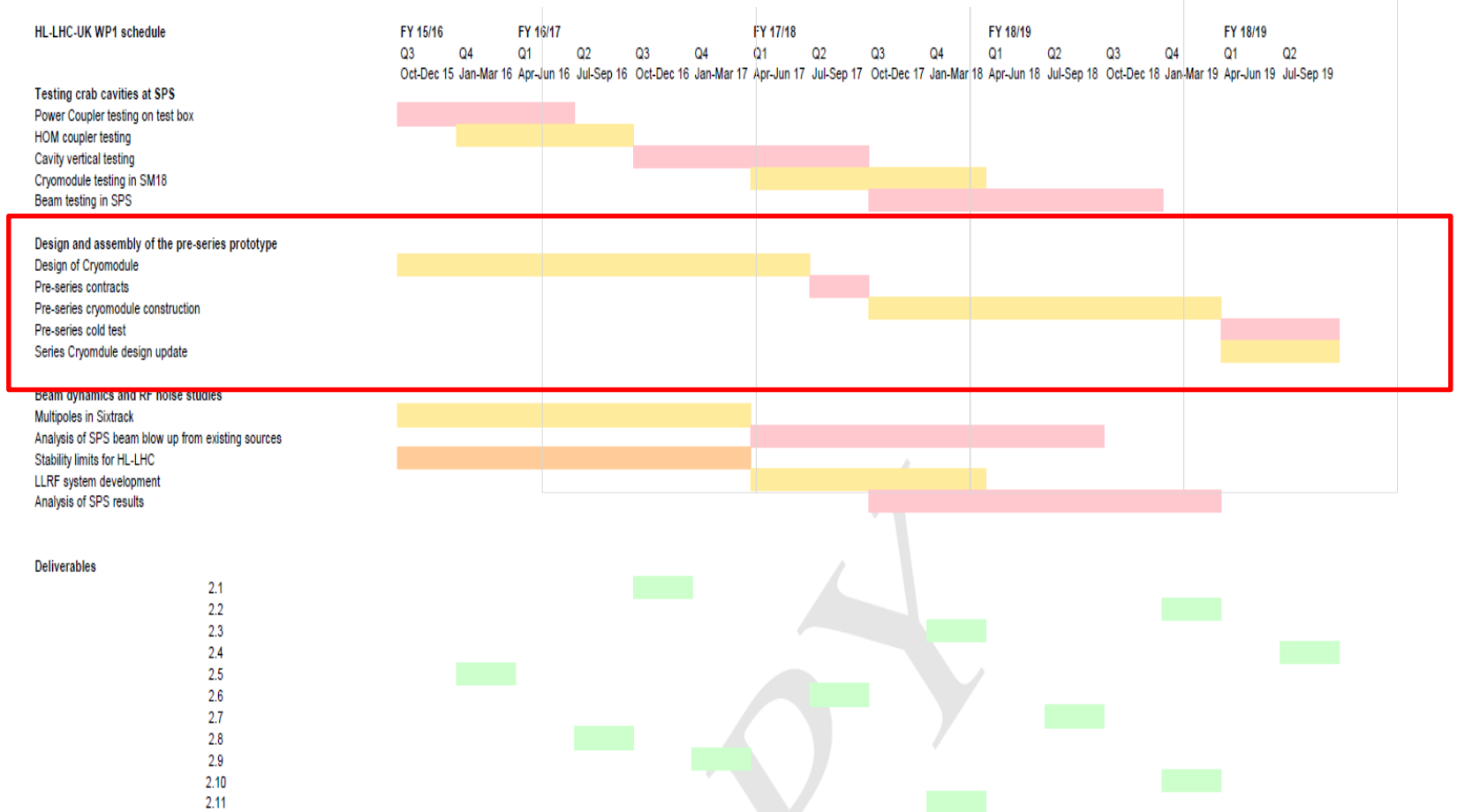


Figure 5.1: Schedule and milestones for WP2.

STFC Requirements and Constraints

- Funding duration is fixed - cannot be extended beyond **March 2020**
- Primary deliverable cannot be changed !
- Any changes to original scope/plan require approval
- Approval needed for Annual Spending from ASTeC Management and Program Office
- Anything unspent or underutilised will not be available in the following year
- But, there is always a possibility of reallocation of funds from year to year if requested 4-6 months in advance

Assessment of the situation

- Funding arrived about 6 months late (was expected in November)
- SPS/ LS2 plans have changed ...
- We need to reassess the situation and revise the delivery plan ..

There are 4 CMs where STFC can contribute

- 1) SPS-DQW
 - Already in progress, led by CERN scheduled to be installed on SPS in Nov 2017
 - STFC will continue to participate in the development / preparations
- 2) SPS-RFD
- 3) Pre Series -DQW
- 4) Pre series -RFD

Scenarios

(Year 1)

SPS-DQW

- STFC will continue to participate in the development / preparations.
- Areas of responsibilities can be worked out (this meeting)

(Years 2 to 4)

Scenario 1

STFC begins the development of Pre-Series CM for RFD or DQW with an aim to assemble and deliver the CM in March 2020

This will be highly dependent upon the outcome of the SPS tests followed by the delivery of the qualified PS Cavities by Sept 2019

Scenario 2

STFC begins a design study to develop a Pre-Series CM for RFD that will be compatible with SPS (let's call it **SPS+**) with an aim to assemble and deliver the SPS+ in March 2020.

This will need a plan to deliver qualified RFD cavities by Sept 2019

Scenario 3

There is a delay in producing qualified cavities as planned above. This will push CM assembly beyond March 2020. Completion will only possible if CERN contract (funding) can be extended in to year 5.

What is needed now?

- Define the scope
- Revision of costs with funding profile
- Milestones and Deliverables
- Delivery Plan
- Spending profile
- Risks with mitigations

Way Forward?

- **(Y0 to Y1)**
- STFC continues to participate in preparing SPS CM in Y1/2

- **(Y2 to Y4)**

- Revisit the situation before M12
- SPS+ my own preference (one less CM !)

- STFC starts working towards developing requirements in M12.
- Design review and issue detail procurement / manufacturing plan M24
- Procurement M24-M42
- Assembly procedures review (M30)
- Assembly begins (M40)
- Acceptance and delivery Y48

- In addition,
STFC participates in SPS assembly activities (to gain experience and in preparation for PS-CM)