Format of the session

1. Short Introduction to the Meeting: schedule, expected outcome

2. Presentation of work-packages by WP holders (3-4 slides). Technical description, rough schedule, resources (10 – 15 min each)

3. Each presentation followed by statements by collaborators about their planned/potential contributions and discussion on practical details (about 15 – 20 min each)

4. Final wrap-up, collecting all information

N.B.: Some WPs have common aspects/overlap with other activities' work-packages. Main examples:

- CLIC0-001 (CLIC Zero Front-end), with CTC-012 & CTC-014
- CTF3-004 (Modules in CTF3) with CTC-004
- …

R. Corsini
CLIC work-package planning meeting
2-3 November 2011

Format of the session

- 25-30 people participating, about 2/3 collaborators
- Representing 11 Institutes
- 12 presentations in total, 6 from collaborators
- Time for informal contacts, discussions

Aim of the session

1. Collect all available info on contribution from collaborators to the CLIC work program 2012-2016

   - Ongoing activities
   - Planned and funded contributions
   - Potential contributions

2. For each Institute and each work-package, if possible review and collect in excel-sheet format the information, including *existing and potential* resources

3. Such information will enable the CLIC study to review the work program, and

   - Streamline, prioritize or delay part of the program if too many resources are missing or the interest within the collaboration for some parts is not strong enough
   - Negotiate with the CERN management (Departments and Groups) the detailed resources needed for the next phase, to complement the outside effort

4. The meeting will also help to better focus the technical details of the program

5. Last, we need to collect the information on the status of the formal agreements (MoUs, k-contracts…), in order to establish/renew them as needed

The collected information will of course be not complete – a detailed follow-up will be done with all collaborators, especially at the work-package level

R. Corsini
CLIC work-package planning meeting
2-3 November 2011

Aim of the session

- The vast majority of collaborators handled in the excel sheets
- Most reported only funded activities, time profile peaked in the first two/three years
- Need to better define and gather information about existing (likely?) and potential (wished for?) resources
- Good exchange of information also at the technical level
- Most collaborations need a new/renewed formal agreement

R. Corsini
CLIC work-package planning meeting
2-3 November 2011

Overview

	CTF3-001	CTF3-002	CTF3-003	CTF3-004	CLIC0-001	CLIC0-002	BTS-001	BTS-002
CEA, Saclay								
CIEMAT								
IFIC, Valencia								
UPC, Barcelona								
IPM, Teheran								
INFN, Frascati								
Oxford/JAI								
IAP, Nizhny Novgorod								
Oslo/NorduCLIC								
Uppsala/NorduCLIC								
10	4	2	1	6	4	1	n.c.	n.c.

Potential
Dubna
PSI
Lancaster
Grenoble
Soltan Inst.
…

Summary of the "Experimental Verification" activities

WP: CTF3-001 CTF3 consolidation & upgrades Leader: F. Tecker	Purpose/Objectives/Goals: Enable CTF3 continued operation until 2016 with performances compatible with the experimental program (system performance)	Deliverables	Schedule
Task 1: Energy upgrade	Required for long string of modules. Useful for TBL deceleration demonstration, TBL+ high power testing, drive beam transport in modules, beam tests.	2 new modulators/klystrons (3GHz, 45 MW) and associated infrastructure. M budget: 2.5 MCHF	1st MDK: 2012 – 2Q 2nd MDK: 2013 – 1Q
Task 2: Repetition rate upgrade	Required for TBL+ high power testing. Useful for operation.	Additional shielding, pulsed charge power supplies for MKS, interlocks. M budget: 3.5 MCHF	Interlocks: 2011 - 3Q MKS PS: 2012 - 1Q Shielding: 2013 - 1Q
Task 3: Consolidation, stability, operation	Required for continued CTF3 operation 2012-2016.	Consumables (klystrons), spares (TWTs), feed-backs, diagnostics and control system maintenance and improvements, operating support. M budget 9 MCHF	Distributed 2012-2016
Task 4: Effect of beam-loading on breakdown	Assess the break-down rate behaviour in beam-loaded X-band structures	Re.furbish CTF3 dog-leg, RF network Eperiment report. M budget: 0.5 MCHF	2012 - 1Q 2013 - 1Q

Link to other WPs/activities: This WP is integrated to WPs CTF3-002, CTF3-003 and CTF3-004

Lead collaborator(s):CEA/Saclay, Uppsala/NorduCLIC, Oslo/NorduCLIC, IPM Teheran - CERN: BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	3500	3500	3000	3000	2000	15000
Personnel (FTE)	20	20	15	15	15	85

Most resources will necessarily come from CERN. Basically **uncompressible** if any CTF3 program is to be preserved.

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	5	5	10	10	10	40
Personnel from Collaborators (FTE)	2.5	2	2	1.5	1.5	9.5

Summary of the "Experimental Verification" activities

WP: CTF3-002 Drive Beam phase feed-forward and feedbacks **Leader: P. Skowronski**	**Purpose/Objectives/Goals:** Understand sources of drive beam phase jitter, develop and test feed-forward system to stabilize drive beam phase (performance, risk)	**Deliverables**	**Schedule**
Task 1: Drive Beam phase monitors	Understand sources of drive beam phase jitter. Used in feedbacks and feed-forward test.	Drive Beam phase monitor prototype, phase monitor small series (2-3), electronics and acquisition. M budget: 0.2 MCHF	Monitor proto: 2011 – 4Q Monitor series: 2013 – 2Q
Task 2: Feed-forward kickers	Required to demonstrate feed-forward performance.	Two strip-line kickers. M budget: 0.15 MCHF	2012 – 4Q
Task 3: Feed-forward pulsers	Required to demonstrate feed-forward performance.	Fast amplifiers for the two kickers. Fast electronics. M budget: 1.25 MCHF	2013 – 4Q ?
Task 4: Infrastructure and operation	Required for testing.	Cabling, infrastructure, controls, operational support. M budget: 0.5 MCHF	Distributed 2012-2016

Link to other WPs/activities: This WP depends on WP CTF3-001

Lead collaborator(s): INFN/LNF, Oxford Un./J. Addams, CERN: BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	400	600	600	300	200	2100
Personnel (FTE)	5	5	5	5	5	25

Work plan reviewed with INFN-Frascati & Oxford and updated. Need to check total resources and repartition with collaborators.

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	180	125	75	150	150	680
Personnel from Collaborators (FTE)	3.6	3.1	2.6	2.6	2.6	14.5

Summary of the "Experimental Verification" activities

WP: CTF3-003 TBL + Leader: S. Doebert	Purpose/Objectives/Goals: Contribute to high-power testing program of accelerating structures, understand break down behavior of PETS-structure system and conditioning scenarios (performance, cost)	Deliverables	Schedule
Task 1: Upgrade of TBL drive beam line	Provide high-power slots for testing.	4 PETS with input couplers, waveguide network, supports and cables. M budget: 750 kCHF	2012 – 2013
Task 2: RF Test stands	RF conditioning and high-power testing of structures.	waveguide network, supports and cables, instrumentation and control for 4 slots M budget: 750 kCHF	First slot: 2012 – 4Q Addit. 3 slots: 2013 – 4 Q
Task 3: operation	Support testing.	Maintenance, operating support. Annual reports on testing results. M budget: 1 MCHF	Distributed 2012-2016

Link to other WPs/activities: This WP is partly overlapping with WPs CTF3-000

Lead collaborator(s): CERN: BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	950	950	200	200	200	2500
Personnel (FTE)	4	4	2	2	2	14

Material budget for full eight slots – (four slots ~1 MCHF less)

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	200	200	0	0	0	400
Personnel from Collaborators (FTE)	1.5	1.5	0.5	0.5	0	4

Summary of the "Experimental Verification" activities

WP: CTF3-004 Two-Beam module string Leader: R. Corsini	Purpose/Objectives/Goals: Understand behaviour and limitations of a few generations of CLIC two-beam modules in a real accelerator environment testing them with beam (performance, cost)	Deliverables	Schedule
Task 1: First phase	Test behaviour of a single complete Two-Beam Module.	One Two-Beam Module type 1 installed and tested in CTF3 M budget: 0.5 MCHF	2013 – 1Q
Task 2: Second phase	Test behaviour of a module string with a minimum number of interconnects.	Two-Beam Module string (type 101) installed and tested in CTF3 M budget: 0.75 MCHF	2014 – 1Q
Task 3: Third phase	Test behaviour of a module string, new generation.	Two-Beam Module string, new generation (3 modules) M budget: 0.75 MCHF	Modules: 2016 – 1Q
Task 4: Operation	Provide operational support	Provide operational support M budget: 1 MCHF	2012 to 2016

Link to other WPs/activities: This WP is linked to WP CTC-004 – only installation/operation budget foreseen

Lead collaborator(s): Uppsala, IRFU/Saclay, CERN: BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	500	700	700	600	500	3000
Personnel (FTE)	4	4	4	4	4	20

Resources comment: Only resources for installation/integration/services/running in CTF3 are accounted for here. Resources for module construction in CTC-004.
Other comments: total CTF3 manpower (2012) 31 FTE, 30 only CERN in 2011.

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	50	50	50	50	50	250
Personnel from Collaborators (FTE)	2	2	2	2	2	10

Summary of the "Experimental Verification" activities

WP: CLIC0-001 Drive Beam Front-End Leader: S. Doebert	Purpose/Objectives/Goals: Assess CLIC drive beam injector/front-end performance, provide focus for development and industrialization of CLIC large series components (1 GHz MDKs and accelerating structures), constitute first building block of CLIC Zero (risk, cost)	Deliverables	Schedule
Task 1: Design & preparation	Overall optimization of CLIC injector, study of implementation	Detailed design of facility, implementation plan	2012 – 4Q
Task 2: Gun	Provide gun	Thermionic electron gun, HV deck and front-end controls	2013 – 4Q
Task 3: RF structures	Provide structures for bunching system and acceleration.	Three 500 MHz wide-band sub-harmonic bunchers, one single-cell pre-buncher, one travelling wave buncher, 6 (3) accelerating	SHBs: 2014 – 2Q PB, buncher: 2014 – 4Q Structures: 2015 – 4Q
Task 4: RF high-power system	Provide RF high-power system	500 MHz sources (TWTs?), 12 (Four) 15 MW 1 GHz Modulators-Klystrons, waveguide networks, operational support M budget: 16 MCHF (6 MCHF)	TWTs: 2014 – 2Q 2 MKS proto: 2014 – 4Q MKS series: 6 2015 – 4Q 6 in 2016 – 4Q
Task 5: RF low-power system	Provide RF low-power system	low-power systems , 500 MHz and 1 GHz, timing system, diagnostics, operational support	Protos: 2014- 2Q Series: 2015 – 4Q
Task 6: Magnets	Provide magnets	Solenoids, quadrupoles (about 12), four bending magnets, H-V dipole correctors M budget: 2 MCHF	Solen./corr.: 2013 – 4Q Quadrupoles: 2015 – 4Q Bends: 2015 – 4Q
Task 7: Vacuum	Provide vacuum system	Vacuum chambers, pumps, gauges, control system, collimators,	Distributed 2013 – 2016
Task 8: Diagnostics	Provide diagnostics	BPMs - electrostatic (~4), BPMs - magnetic (~ 5) - transverse profile monitors (3), time resolved energy spectrum measurement, operational support. M budget: 1.3 MCHF	BPM e: 2013 – 4Q BPM m: 2014 – 4Q Monitors: 2013 – 2015 Spectro: 2014 – 4Q
Task 9: Controls	Provide controls	Injector control system, operational support. M budget: 1 MCHF	Distributed 2013 – 2016
Task 10: Civil Engineering & Infrastructure	Provide building and infrastructure	Shielded hall, Cooling and ventilation, electrical equipment, cabling. M budget: 4 MCHF	2013 – 4Q Cabling Distr. 2013 – 2016
Task 11: Commissioning & Operation	Provide commissioning and operation		Distributed 2012 – 2016

Link to other WPs/activities: This WP is linked to WP CTC-004

Lead collaborator(s): CERN: BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	500	3000	4750	4750	5000	18000
Personnel (FTE)	5	10	15	20	20	70
Resources comment: technical manpower partly shared with CTF3						

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	0	0	0	0	0	0
Personnel from Collaborators (FTE)	3.5	3.5	2.5	2.5	1	13

Summary of the "Experimental Verification" activities

WP: CLIC0-002 Drive Beam photo-injector option Leader: S. Doebert	Purpose/Objectives/Goals: Assess potential of photo-injector option as alternative for the CLIC drive beam front-end	Deliverables	Schedule
Task 1: Laser and photocathode development	Continue working with PHIN set up, study increased bunch charge and cathode lifetime issues Try to generate CLIC-like laser pulses to study average power and train stability issues. Work on alternative	Reports	PHIN, 2012-2014 Laser, 2012-2014
Task 2: RF & beam dynamics studies	Design 1 GHz RF gun, study of beam loading, beam dynamics, vacuum and cooling Option: build and test RF gun ? Resources not included…	Reports	2012-2014

Link to other WPs/activities: This WP is linked to WP CLIC0-001

Lead collaborator(s): CERN: EN/STI, BE/RF, BE/BI, BE/ABP, BE/OP

Estimated resources (needed):	2012	2013	2014	2015	2016	Total
Material (kCHF)	300	300	300	300	300	1500
Personnel (FTE)	2	2	2	2	2	10

Resources comment: Need review/discussion with EN/STI. Resources only for basic program – no RF gun + parallel installation in front-end
Need to provide laser operation and maintenance for CALIFES (operational budget)

	2012	2013	2014	2015	2016	Total
Material from Collaborators (kCHF)	0	0	0	0	0	0
Personnel from Collaborators (FTE)	1.5	1.5	1.5	1.5	0	6

Summary

Work Package	Estimated resources (needed):	2012	2013	2014	2015	2016	From Collaborators	From CERN	Total	Ratio
CTF3-001	Material (kCHF)	3500	3500	3000	3000	2000	40	14960	15000	0.3%
	Personnel (FTE)	20	20	15	15	15	9.5	75.5	85	12.6%
CTF3-002	Material (kCHF)	500	900	1100	300	200	680	2320	3000	29.3%
	Personnel (FTE)	4	4	4	4	4	14.5	5.5	20	263.6%
CTF3-003	Material (kCHF)	950	950	200	200	200	400	2100	2500	19.0%
	Personnel (FTE)	4	4	2	2	2	4	10	14	40.0%
CTF3-004	Material (kCHF)	500	700	700	600	500	260	2740	3000	9.5%
	Personnel (FTE)	3	3	3	3	3	10	5	15	200.0%
							0	18000	18000	0.0%
							13	57	70	22.8%
							0	1500	1500	0.0%
							6	4	10	150.0%
							0	2500	2500	0.0%
									10	0.0%
									1000	0.0%
									20	0.0%
									6500	**3.06%**
									244	**30.48%**

THANKS TO EVERYBODY!

mated?

d, exploitation of existing facilities…)

- Some WPs in excellent shape, others need more effort

Summary of the "Experimental Verification" activities

	Old Name	New Name	Name	WP Holder	Note
General	CLIC-001		CLIC General	S. Stapnes	
Parameters and design Daniel Schulte	BPH-BASE	CD-BASE	Integrated Baseline Design and Parameters	D. Schulte	
	BPH-SIM	CD-SIM	Integrated Modelling and Performance Studies	A. Latina	
	BPH-FEED	CD-LUMI	Feedback Design	D. Schulte (interim)	
	BPH-MP	CD-OP	Machine Protection & Operational Scenarios	M. Jonker	
	BPH-BCKG	CD-BCKG	Background	D. Schulte (interim)	
	BPH-POL	CD-POL	Polarization	-	
	BPH-SRC E	CD-ESRC	Main beam electron source	S. Doebert	
	BPH-SRC P	CD-PSRC	Main beam positrion source		Searching (S.Doebert interim contact point)
	BPH-DR	CD-DR	Damping Rings	Y. Papaphilippou	
	BPH-RTML	CD-RTML	Ring-To-Main-Linac	A. Latina	
	BPH-ML	CD-ML	Main Linac - Two-Beam Acceleration	D. Schulte (placeholder)	ABP request 2013 (also linked to CTF3 activities)
	BPH-BDS	CD-BDS	Beam Delivery System	R. Tomas	
	BHP-MDI	CD-MDI	Machine-Detector Interface (MDI) activities	L.Gatignon	
	BPH-DRV	CD-DRV	Drive Beam Complex	B. Jeanneret	ABP request 2014 - (also linked to CTF3 activities)
Experimental verification Roberto Corsini	CTF3-001		CTF3 Consolidation & Upgrades	F. Tecker	
	CTF3-002		Drive Beam phase feed-forward and feedbacks	P. Skowronski	
	CTF3-003		TBL+, X-band high power RF production & structure testing	S. Doebert	
	CTF3-004		Two-Beam module string, test with beam	-	ABP request 2013 (see above)
	CLIC0-001		CLIC 0 drive-beam front end facility (including Photoinjector option)	S. Doebert	
	CLIC0-002		Drive Beam Photo Injector	S. Doebert	
	BTS-001		Accelerator Beam System Tests (ATF, Damping Rings, FACET,...)	R. Tomas	(Tasks holders: R.T., Y.P. and A.L.)
	BTS-002		Sources Beam System Tests	-	Collaborators? split in 2 ?
Technical Developments Hermann Schmickler	CTC-001	CTC-WIG	Damping Rings Superconducting Wiggler	P. Ferracin	
	CTC-002	CTC-SUR	Survey & Alignment	H. Mainaud	
	CTC-003	CTC-QUA	Quadrupole Stability	K. Artoos	
	CTC-004	CTC-TBM	Two-Beam module development	G. Riddone	
	CTC-005	CTC-WMP	Warm Magnet Prototypes	M. Modena	
	CTC-006	CTC-BDI	Beam Instrumentation	T. Lefevre	BI request 2012
	CTC-008	CTC-PCLD	Post Collision Lines and Dumps	E. Gschwendtner	
	CTC-011	CTC-CO	Controls	M.Draper	
	CTC-012	CTC-RF	RF Systems (1 GHz klystrons & DB cavities, DR RF)	E. Jensen (placeholder)	RF request 2014?
	CTC-013	CTC-EPC	Powering (Modulators, magnet converters)	S. Pittet	
	CTC-014	CTC-VAC	Vacuum Systems	C. Garion	
	CTC-015	CTC-MM	Magnetic stray Fields Measurements	S. Russenschuck	
	CTC-016	CTC-BT	Beam Transport Equipment	M. Barnes	
	CTC-017	CTC-MME	Creation of an “In-House” TBA Production Facility	F.Bertinelli (placeholder)	
X-band Technologies Walter Wuensch	RF-DESIGN	RF-DESIGN	X-band Rf structure Design	A.Grudiev, I. Syratchev	
	RF-XPROD	PRODUCTION	X-band Rf structure Production	G.Riddone	
	RF-XTESTING	TESTING	X-band Rf structure High Power Testing	S.Doebert	
	RF-XTESTFAC	TEST AREAS	Creation and Operation of x-band High power Testing Facilities	E.Jensen (placeholder)	RF request 2012, move construction to Techncial Developments when defined
	RF-R&D	HIGH-GRADIENT	Basic High Gradient R&D	S.Calatroni	
Implementation studies Philippe Lebrun		IS-CES	Civil Engineering & Services	J. Osborne	
		IS-PIP	Project Implementation Studies	P.Lebrun	

Experimental Verification

- Present experimental program of CTF3 (feasibility issues)
  ⇨ completed by **end 2012**

Goals for (2011-2016):

- Consolidation/upgrade of CTF3 **to fully exploit its potential**:
  - Verify **stability/reliability performance** in view of CLIC requirements , improve operational experience
  - Contribute to **high-power RF testing**, demonstrate **operation of a drive -beam driven power source**
  - Test with beam CLIC **two-beam modules**

  CTF3-001, CTF3-002, CTF3-003 & CTF3-004

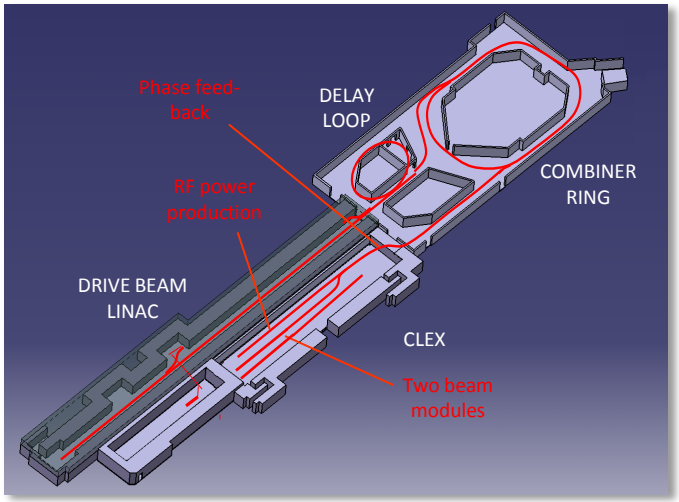
- New drive beam injector facility, at nominal CLIC parameters
  - Final proof of drive beam performances, **long-pulse, high -power operation**
  - provides a **focus for development and pre-industrialization of drive beam components** – all hardware reusable
  - **First step towards CLIC Zero**, facility for….

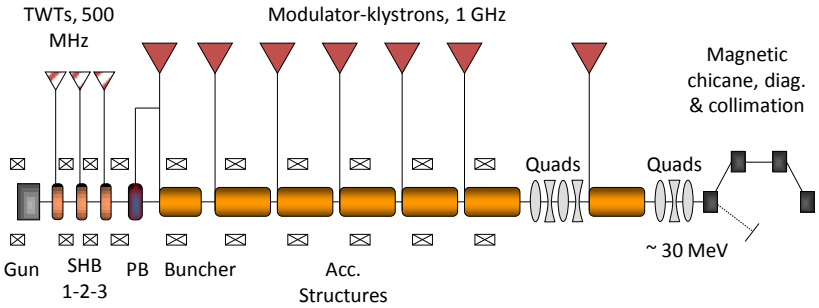
  CLIC0-001 and CLIC0-002

- Pursue and intensify **experimental program in other facilities**
  - ATF II
  - CesR-TA, SLS, ATF I, ANKA…
  - Facet, Asset
  - …

  BTS-001 and BTS-002

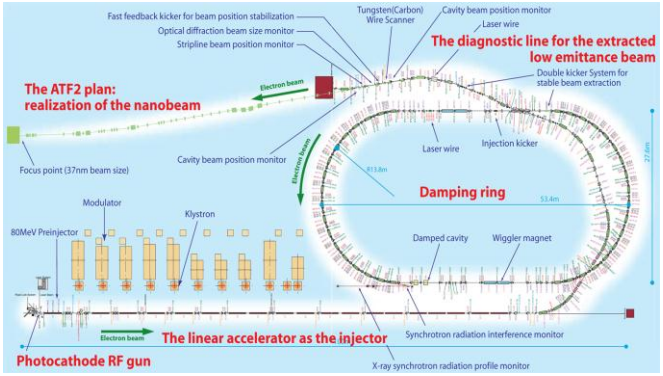
CTF3+





CLIC Drive Beam injector schematic layout

ATF - KEK

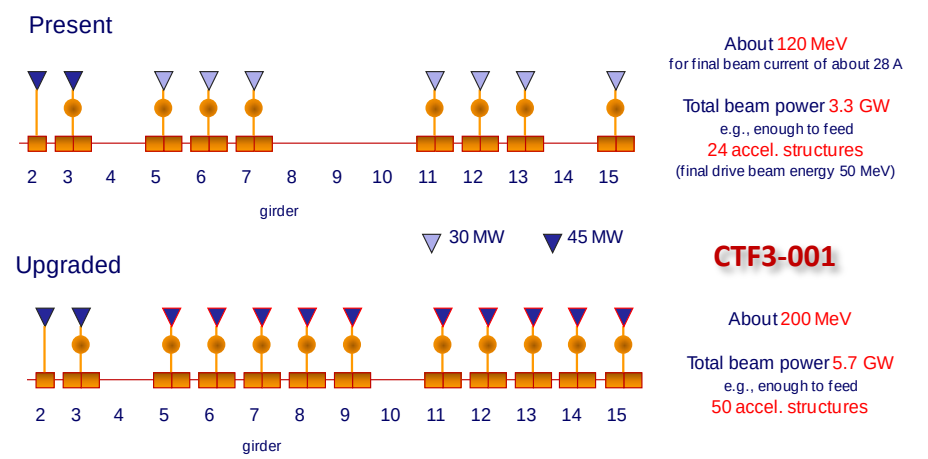


Summary of the "Experimental Verification" activities

Test facilities – CTF3+

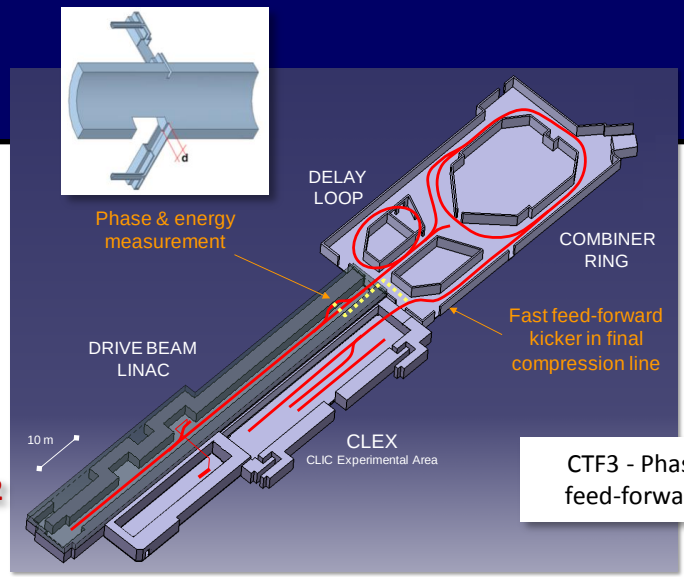
CTF3 consolidation and upgrade

- Consolidation and upgrade (higher energy, stability, reliability, rep. rate)
- Drive beam phase feed-forward experiments
- Upgrade and operate TBL as 12 GHz power production facility
- Operation with beam of a long string of CLIC two-beam modules



CTF3-001

CTF3 consolidation and upgrade

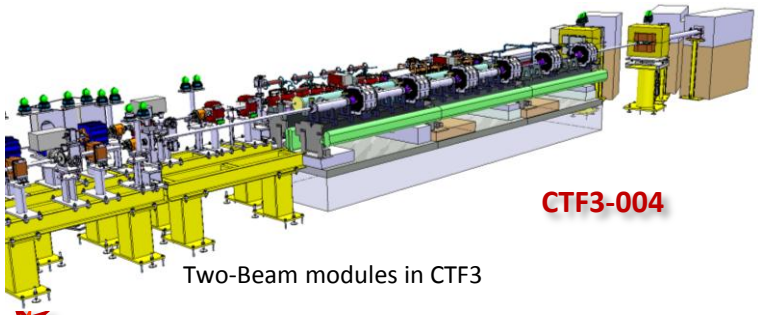


CTF3-002

CTF3 - Phase feed-forward

TBL - CLEX

CTF3-003



CTF3-004

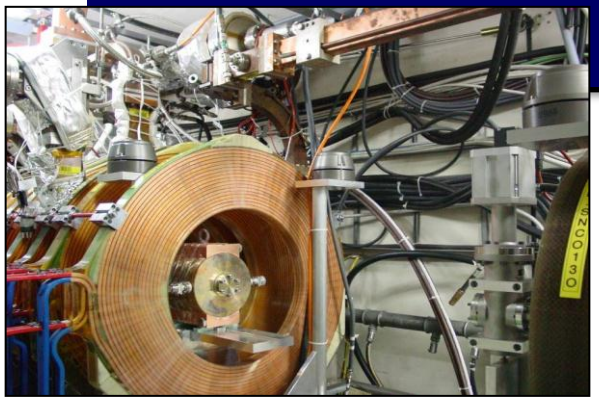
Two-Beam modules in CTF3

R. Corsini
CLIC work-package planning meeting
2-3 November 2011

CLIC Drive Beam Front-end

Build and commission 30 MeV Drive Beam front-end with nominal CLIC parameters

- Build and commission 30 MeV Drive Beam injector with nominal CLIC parameters
- Build and commission a few Drive Beam accelerator nominal modules
- Contribution to Technical Design of full CLIC Zero facility



CTF3 Injector

CLIC0-001 and CLIC0-002

CLIC Drive Beam injector schematic layout