HARPS EGGS FDR RIX

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	Gaspare Lo Curto	**GLC**	**Project scientist**

Reviewer	RIX nr	RIX type	Doc nr	page/ section	text	Replier	text2	conclusion
FPE	FPE-0	RID	ALL	General	Major discrepancy: EGGS should be scrambled instead of HAM! This aspect might jeopardize the whole Omelette.	JCA	Moreover in 3P6-DSD-ESO-754-0001 is mentioned the plan to put EGGS into a sandwich, and not HAM. This should be stopped and rather go to a cazuela.	Ok. EGGS will be scrambled and mixed with HAM, and then put on the sky.

FPE	FPE-1	RIQ	Project plan	General	The schedule is very dense. Could you indicate the critical path and the status of the schedule, at present?	JAL / WEC	The schedule is very dense because the technical commissioning date was fixed for July 17. All the tasks following the arrival of G.Avila to La Silla are on the critical path. Other tasks that could potentially become critical are: The delivery of the Nickel plates with 5 days contingency. The fibre head and tools machining with 16 days contingency.(The fibre head machining will depend on a single human resource). Today we are still on schedule. The electronic prototype has being successfully tested and the block prototype is finished. Important to mention that the schedule is in fact tight and dense, therefore we will need the full support of the management regarding the resources, specially human resources.	Answer accepted
FPE	FPE-2	RID	Project plan	Point 2.1	I think that the technical commissioning will last 4 nights. Please correct.	GLC	This is correct, project plan to be changed accordingly.	Answer accepted
FPE	FPE-3	RIQ	Project plan	Point 2.2	I would like to point out here the importance for having foreseen sufficient time between Technical and Scientific Commissioning (Trigger, STS, DRS must be modified also). I propose that the "After technical commissioning" activities are detailed in the project plan, as well, in collaboration with Geneva. Note also that 4 Scientific Night Commissioning are really required to verify the actual performances.	GLC	4 technical nights were requested for P76 for scientific commissioning. In the request is specified that these have to be scheduled from the end of November onward. This would give three months to prepare changes needed in the DRS and the trigger. STS, althought relevant, is less critical as in its absence the standard ESO tools will be used (p2pp, OT). It is right that the post technical commissioning activities have to be detailed. Input from Geneva will be required.	Action Item Nr. 7
FPE	FPE-4	RIC	3P6-PLA-ESO-90400-0002	Sec. 3	I would also foresee dark exposures (1 hour).	GLC	Agreed, added in day operations plan.	Answer accepted
FPE	FPE-5	RIC	3P6-PLA-ESO-90400-0002	Sec. 3	Please add also a series of ThAr exposures (ThAr2 on both fibers)	GLC	Agreed, added in day operations plan.	Answer accepted
FPE	FPE-6	RIC	3P6-PLA-ESO-90400-0002	Sec. 3.1.5	The shutter linearity and minimum exposure time could also be determined by carrying out exposures with Texp ranging from 0.01 to 10 sec.	GLC	Shutter linearity can be checked in the way suggested here, using the tungsten lamp, but the error in the measurement would be large due to intrinsic lamp intensity variations. It will be possible however ot obtain at least an upper limit to the shutter non linearity. Added to document.	Answer accepted

FPE	FPE-7	RIC	3P6-PLA-ESO-90400-0002	Sec. 3.1.3 and 3.1.6	These two test belong somehow together, since it will be very interesting comparing the two modes. So I would suggest to do the same calibration set for both modes and define which parameters to compare. E.g. also the relative fiber transmittance (cleared from the surface factor) can be determined in laboratory. Make also a chromatic comparison (at three different wavelengths.	GLC	This reduces in taking tungsten and ThAr exposures for both modes in the same conditions (with same exposure times, etc.) for later comparison. Added to document in form of an additional point.	Answer accepted
FPE	FPE-8	RIC	3P6-PLA-ESO-90400-0002	Sec. 4.1.2	I would suggest to call this test "On-sky comparison of HAM and EGGS" and join the test with 4.1.3. The goal should be to compare the spectra taken with both modes alternatively with regard to flux and chromatic response, as a function of seeing and airmass. This test will also help to identify possible problems with the ADC.	GLC	The test was renamed, referring to both the flux and the chromatic response comparison. Section 4.1.3 has been left independent but it has been added that the faintest EGGS star should also be observed with HAM for comparison.	Answer accepted
FPE	FPE-9	RIC	3P6-PLA-ESO-90400-0002	Sec. 4.1.5	This test my be rather a task for the scientific commissioning, since no direct RV feedback from the pipeline is expected yet. However, it might be helpful to make a decentering series on a bright object, and also several through focus RV-exposures, which might be analysed off-line. 4 hours is ok for the technical commissioning, but much more time for these tests should be foreseen at the scientific commissioning.	GLC	Agreed, the idea was to supply data for offline study once the pipeline is ready. It would help to better focus the test during the scientific commissioning. Moreover give one more possibillity to get the test done with good seeing. No action taken (scientific commissioning plan still to prepare).	Answer accepted
FPE	FPE-10	RIC	3P6-PLA-ESO-90400-0002	Sec. 4.1.6	I would propose time series on bright objects, and long exposures on very faint objects, e.g. mv~17	GLC	Both points added, but more detail is needed. I propose to iterate more with the consortium (could also be after the FDR).	Answer accepted
FPE	FPE-11	RIC	3P6-PLA-ESO-90400-0002	Sec. 5	This section can be elaborated after the Technical Commissioning in collaboration with Geneva. The goal should be to characterize the EGGS spectroscopic and RV performances, and perform scientific exposures to verify these performaces (faint objects, series of asteroseismology, etc.) Of course the pipeline will be tested, as well, during these tests, and possibly improved or adapted.	GLC	This is exactly the idea. Text added.	Answer accepted

FPE	FPE-12	RIC	3P6-DSD-ESO-754-0001	Sec. 2.1 and 2.2	This discussion of the tolerances assumes (if I am right) that the used components are "perfect". But the might be tolerances in the parallelism between mechanical axis of the ferrule and optical axis of the fiber, or edge in the fiber end, or center of curvature of the rod lens not on the axis defined by the center of the flat part, or the flat part of the rod lens is not perpendicular to the optical axis of the lens, etc. My question is how these tolerances can impact the final result.	JAL / WEC	We are not assuming that the components are perfect, but unfortunately we do not have much data on how imperfect they are, for example, the tolerances of the rod lens manufacturing. So our approach is to work always on the very safe side, you see that for the rod lens axis – fibre axis misalignment we can tolerate 0.5 degree, but we will take the safe approach by manufacturing a precise bushing for seating the lens aligned within one arcmin. Additionally the final alignment will be done when gluing the rod lens to the ferule and the ferule to the head by dedicated tools and the final result will be controlled and corrected by optical tests before the glue cures, thus compensating the errors.	Answer accepted
FPE	FPE-13	RIQ	3P6-DSD-ESO-754-0001	Sec. 3.2, point 4	Did you check the surface quality (flatness) in proximity of the drilled hole, and the quality of the drilled holes?	JAL	Inspecting our test plate we found the hole's interface to be perfectly clean outside a <5microns annulus around the hole and the hole shape looks almost perfectly round. Carefull visual inspection of the plate shows no deformation near the holes, it really looks flat.	Answer accepted
FPE	FPE-14	RIQ	3P6-DSD-ESO-754-0001	Figure 14	Can the two fibers be adjusted independently into the head, or only jointly.	JAL	The fibers or ferules are adjusted independently by the aid of tool 2, in fact the ferules are glued into the head one by one.	Action Item Nr. 1
FPE	FPE-15	RIC	3P6-DSD-ESO-60400-0002	General	I have no particular questions about the document. I just would like to comment that I apprecaite the choice of a solution which allows to change to the new system only by recambling and without modifying the existing hardware.	JAL	Thank you. Additionally the new hardware is such that even if the "HEFS control box" is not powered the existing hardware (HAM) will continue operating normally.	Answer accepted
FPE	FPE-16	RIC	3P6-SDS-ESO-80030-0005	Title/Keywords	Change ESSG into EGGS	JAL	It will be changed asap.	Answer accepted
FPE	FPE-17	RIQ	3P6-SDS-ESO-80030-0005	Sec. 3.1	Is there a special reason for having only two instrument modes? Wouldn't it be more logic for having modes 1 to 4?	GLC/TSH	There will be 4 instrument modes: HAW, EGGS, CES, DARK. The text should be made clearer.	Answer accepted
FPE	FPE-18	RIQ	3P6-SDS-ESO-80030-0005	Sec. 3.1	Please verify that the setup commands for HAM and DARK correspond to the present situation.	TSH	Setup for DARK and CES modes remain the same as present situation, HAM mode has an extra command to make sure the proper shutter is selected.	Answer accepted

FPE	FPE-19	RIQ	3P6-SDS-ESO-80030-0005	Sec. 3.3	I would propose to keep the original Template files (seq, tsf, ref) in addition to the new files for HAM, at least until the new templates have been verified for both HAM and EGGS. Please note that the file names trigger the current DRS. STS, TRIGGER and DRS will have to be updated to understand the new names.	TSH	I agree with this. but we must update the instrument mode name (HAPRS-> HAM) anyway in some files. or keep the old HARPS name.	Action Item Nr. 5
FPE	FPE-20	RIQ	3P6-SDS-ESO-80030-0005	Sec. 3.4	Describe the new keyword in detail here.	TSH	It will be done a.s.a.p.	Action Item Nr. 5
FPE	FPE-21	RIQ	3P6-SDS-ESO-80030-0005	Sec. 4.1	Is there any feedback signal to check the real shutter "position"	JAL/TSH	The shuttter position is sensed via inductive proximity switches. Important to note that the status of the shutter is reported to PULPO and not to the HARPS LCU which is only responsible of switching between HAM and HEM shutters.	Answer accepted
FPE	FPE-22	RIQ	3P6-SDS-ESO-80030-0005	Sec. 4.2	The special device must first be accepted, then integrated in the VLT package. Will this imply any schedule delays?	TSH	The "haihefs" device is similar to the HCFA iodine cell fans/heater power switch, so I think it should be no problem to be accepted	Answer accepted
FPE	FPE-23	RIQ	3P6-SDS-ESO-80030-0005	Annex 1	Will this SW device be ready and tested by July 2005 for technical commissioning?	TSH	Yes.	Answer accepted
MFL	MFL-1	RIC	3P6-DSD-ESO-754-0001	General	My general feeling is that the design is well advanced and a lot of experience has already been acquired by prototyping and test. I am not able to make remarks on technical detail because this would require more inside view into technical drawings.	JAL	In fact we explored several posibilities for the manufacturing of the head, but at the end we decided to do it in house, so we started doing several tests, experiments and prototyping for gaining experience.	Answer accepted
MFL	MFL-2	RIC	3P6-DSD-ESO-754-0001	Figure 13 C	There might be a risk to introduce a tilt on the rod lens during the motion made by means of the alignment tool. I would propose to guide the lens better, e.g. by making the tool thivker to guide the lens along the lateral faces.	JAL	We considered guiding the lens by the body itself, but we realized that in this case we need a perfectly aligned arm, complicating the design of tool1. After experimenting with a dummy rod lens and considering the oil like charateristic of the glue used we decided to just snap the lens in the arm's hole. You can see that this absorbs any misalignment of the arm, in other words the semi sphere of the lens and the hole works like a spherical joint.	Answer accepted
DSO	DSO-1	RIC	3P6-SDS-ESO-80030-0005	General	The Template Reference guide should be updated as soon as possible, since it will the basis for the STS, Trigger, and DRS changes. Please contact asap the Geneva group (in particular D. Megevand) for that purpose. As said in another RIX, it is very important to coordinate with Geneva the work to be done.	GLC	We are aware of the importance of the coordination with Geneva. This is a prerequisite for the success of the project. The suggested guide should certainly be produced. Meanwhile reference can be done to section 3.3.1 of the document: HAM template names would change from HARPS_ech_XXX to HARPS_ham_XXX and for EGGS these would be: HARPS_eggs_XXX. There will be no new parameters in the templates and the set of actions for each template would not change apart from the eventual movement of the fiber carriage from EGGS to HAM. I return the question and would like to know whether this information is enough to start STS, Trigger and DRS development.	Action Item Nr. 7

DQU	DQU-1	RIC	3P6-SDS-ESO-80030-0005	General	A keaword specifying the instrument mode (if not aready existing) should be added.	GLC	Such keyword already exists: HIERARCH ESO INS MODE = 'HARPS ' / Instrument mode used. Presently the allowed modes are: HARPS, CES and DARK. In the EGGS era they will be: HAM, EGGS, CES, DARK. Some reviewer is suggesting not to change HARPS into HAM. Would this be of advantage to the pipeline related software ?	Answer accepted
GRU	1	RIQ	3P6-PLA-ESO-90400-0002	sect. 3	Would you consider to also check the following functionalities: operation of the mode selector (HAM<->EGGS) under various gravity vectors, linearity of the shutter (flux from calibration lamp vs. exposure time [1-20sec])?	GLC	Indeed, it is a good idea to check the HAM<->EGGS switch under various gravity vectors. Shutter linearity can be checked in the way suggested here, but the error in the measurement would be large due to intrinsic lamp intensity variations. Another idea would be to take solar spectrum in daytime with different exposure times, correcting for the change of sky luminosity due to Earth rotation. It is however a good idea to perform the test, so measuring at least an upper limit to the shutter non linearity. Test added in the commissioning plan.	Answer accepted
GRU	2	RIQ	3P6-PLA-ESO-90400-0002	sect. 4	Would you consider to also check the (effective) spectral resolution? This would allow a modelling/prediction of the achievable RV accuracy.	GLC	The data taken during the commissioning, as well as hopefully the calibration data taken without shutter on May 07, will serve to address the issue.	Answer accepted
GRU	3	RIQ	general	n/a	Is a recovery possible in the (unlikely) case of a broken EGGS fibre?	GLC	EGGS fibers cannot be changed without violating the HARPS consortium constraint to not open the vacuum vessel. In case of breaking, an insert of a new fiber might have to be done, with loss in system efficiency.	Answer accepted
GRU	4	RIQ	3P6-DSD-ESO-754-0001	sect. 3	Can you make any predictions about the lifetime of the shutter (motor, couplings, bearings, blade)?	JAL	For the motor we know it should last for at least 20E6 operations. For the bearing and the coupling we have no data. The blade is not subject to wear, so in principle and if it does not touch any part it should last indefinitely.	Answer accepted
GRU	5	RIQ	3P6-DSD-ESO-754-0001	sect. 2.3	Which mechanical parts of the shutter drive would you think might break, and could they easily be exchanged?	JAL	The most fragile part is the motor. The design is such that it can be easily replaced.	Answer accepted
GRU	6	RIQ	3P6-DSD-ESO-754-0001	sect. 4.3	Is it possible to exchange the nickel reflective plate in case it is contaminated or otherwise damaged, and, if yes, how much effort would be required to realign it with the rod lens?	JAL	In principle is not possible, however we are considering the posibility of stacking two plates when machining the main block. If this is posible we will have two identical nickel plates. We still have to check this carefully and possibly we will need to do another test block before deciding.	Action Item Nr. 2
GRU	7	RIQ	general	n/a	have you foreseen a safe "parking position" in the HCFA for the EGGS and CES fibre heads when they are not in use?	GLC	Formerly the CES fiber was safely stored at the end of every CES run in a box in the Cassegrain cage. This box would be available for either one of CES or EGGS.	Answer accepted

LPA	1	RIC	general	n/a	Documentation: I find missing a kind of overview, which explains the EGGS operations. This is somewhat contained in the SW documents, but I think that it should be added, also it will become part of the new operation manual. How is EGGS (and harps in general) going to be operated in the future ? Which mixed operations (and associated calibrations) will be possible in one night etc..? I think this is an important aspect which needs to be covered, if not at the review, shortly after.	GLC	EGGS operation will not be different from HAM operations. The User requirement document states in section 5.1.1:<<the only change of the instrument operation with respect to the high RV accuracy mode is the position of the fiber carriage in the HCFA.>> The only difference form the observer point of view is in the chioce of the templates: the EGGS templates will have to be used instead than the HAM ones, as stated in the software design document. Detailed documentation on EGGS operating modes should be issued after the technical commissioning but before the second one. This documentation will be part of the user manual and the operation manual.	Action Item Nr. 8
LPA	2	RIQ	3P6-SDS-ESO-80030-0005	sect. 3.1	SW architecture: a new mode is needed. Fine. I do not understand, however, why the old harps mode needs to be renamed. Naively I would expect that the new mode is added, but the old one should not to be re-named. Re-naming may cause problems, for instance, for archive searches or modifications in the pipeline. Is this really needed??	GLC	True, athought it is a little nonsense to have a HARPS mode and a NON-HARPS mode in HARPS. Archiving issue would certainly be more relevant here. Is this really a problem for archiving ?	It has been decided during the meeting that the mode and tempate names of the "old" mode (standard high-accuracy mode) will be left unchanged. The new EGGS mode will adopt the word "EGGS" instead of "ECH".
LPA	3	RIC	3P6-PLA-ESO-90400-0002	sect. 3.1	The time planned for the day tests is exceedingly small . This might be possible if everything was going perfectly smooth. My suggestion is to foresee much longer time for all the tests. There is no reason to limit them to one day or less.	GLC	True, 1 day is enough but only if everything goes well. If we ask for more than one day (before start of technical commissioning) we have less time to work on the system assembly. I would rather stick with one day before the on sky tests. If there remain open questions by the day tests, day time during technical commissioning will be used (we have 4 days).	Answer accepted
LPA	4	RIC	3P6-PLA-ESO-90400-0002	sect. 3.1.3	A few notes on these tests: the calibration flux level for the eggs mode does not need to be as high as in the standard mode, because the fibre is larger (spread over mode pixels), so the overall number of collected electrons will be higher by the same peak flux. I would add some tests on the contamination between the calibration and the science fibres, which will be higher, given the fact that the fibres are larger. This is an important parameters and it can be quantified, for instance taking a number of arcs in only one fibre and looking to the contamination in the other. Finally is extremely important to acquire a redundant set of data (calibrations as well) to feed the whole data reduction package, so that in November for the science tests this can be already tested with real data. The flat field fluxes could be used to have a first estimate on the efficiency of the system. It will not be very precise, but give already an idea if something went wrong.	GLC	The "standard" RV calibration sequence includes the "order localization", which indeed implies to illuminate with the tungsten lamp one fiber at a time. These data can be used to measure fibres "cross talk". This measurement does not involves more tests, just more analysis. A comparison of HAM and EGGS starting from the calibration frames has been planned and inserted in the commissioning plan.	Answer accepted

LPA	5	RIC	3P6-PLA-ESO-90400-0002	sect. 4.1.5	One test that I find very important and possibly should be repeated both in the technical and in the science commissioning is the test of the influence of the star motion on the fibre in eggs mode. Eggs in fact does not have a scrambler, and the scrambling capabilities of eggs require to be quantified properly and repeatedly. I suggest that some suitable star is found (stars with known low RV variations) and tests are performed in all the commissionings by offsetting the object by a known amount in all directions and measuring the RV. Repeat the observations in standard mode and in eggs mode. There are other aspects of the commissioning plan which may be discussed, and I am happy to contribute to that.	GLC	This test is indeed crucial and should be repeated in both commissionings. However I am not sure it is needed to repeat the test for HAM. I believe we have already these data from the HARPS commissioning. This is being the very first iteration on the commissioning plan, and I believe we need to iterate on it. I would propose to continue the discussion by e-mail after the FDR and possibly to have a commissioning plan meeting in June. The manpower issue instead is relevant and should be addressed soon. I will require one astronomer from LSO (apart myself). It would be a good idea if the GTO observer who is starting the GTO run right after the commissioning would participate to the commissioning as well. I would like this to be defined in this review.	Some amount of time should also be invested to compare with HAM under similar conditions, in order to derive concluding values.
LPA	6	RIC	EGGS Project Plan		I could not find any reference/planning to the data reduction pipeline. It is important that this mode is eventually supported as well as the other modes and that a proper plan is made so that an automatic pipeline is working when the science commissioning is occurring	GLC	As you might have read in the commissioning plan, section 5: <<Full availability of the pipeline is essential for the scientific commissioning>>. This was also stated in the requirement document (section 5.4). The plan is to develop the pipeline in the time between the two commissionings. Comments and scheduling for pipeline development will be added to the project plan.	Action Item Nr. 7
IKA	1	RIQ	3P6-SDS-ESO-80030-0005	p. 10-12 / sec. 3.3	Who is responsible the implementation of the templates? LSO SOF group or Geneva?	GLC	LSO SOF.	Answer accepted
IKA	2	RIQ	3P6-PLA-ESO-90400-0002	p.7 / sec. 5	The new EGGS mode is supposed to have impact to HARPS pipeline software. Does this have impact to standard VLT and LSO data handling software?	GLC	No, the data product is identical to the HAM one. Only difference is in the value of some keywords in the fits files and the addition of some other keywords. Keywrods to be added will be subject to approval from Garching as stated in section 5.4 of the document..	Action Item Nr. 5
IKA	3	RIC	Project plan	p. 2	The initials of Tzu-Chiang Shen are TSH.	GLC	Right, TCS might sound confusing… Will be changed.	Answer accepted
IKA	4	RIC	3P6-PLA-ESO - 90400-0002	sec. 3 or 4	Please add the verification of FITS image headers for new keywords.	GLC	Done.	Answer accepted
AMA	1	RIC	3P6-DSD-ESO-60400-0002		To take care in the "HEFS Driver Box Circuit" (2 of 3) to fix a starting condition after a power fail or power on. When one of this conditions comes, the shutter have to force to the close condition, in order to avoid a non desirable light exposure of the detector.	JAL	The open and close states of the shutter are sensed by proximity sensors, the system does not rely on the open or close pulses for keeping track of the state. Additionally after a power fail PULPO always do a test cycling living the shutter in the close state.	Answer accepted
AMA	2	RIC	3P6-DSD-ESO-60400-0002		In the drawing "HEFS Interconnection Cables" it is recommendable to add the signal name to the pin number and cable color. This is to facilitate the maintenance work.	JAL	The signal names will be added to the pin number and color.	Answer accepted
AMA	3	RIC	3P6-DSD-ESO-60400-0002		Add the meaning of the Abbreviations BJP and SESO.	JAL	BJP and SESO will be added to the acronym list.	Answer accepted

GIH	1	RIC	3P6-DSD-ESO-754-0001	p.9/2.3	you have to realize that to reach a plate mounting and dismounting positioning accuracy of 2 microns is difficult	JAL	Yes we do realize the dificulty, but due to the machining method this is achieved, in fact the positioning accuracy is 2 microns because we need to leave some tolerance for inserting and removing the pins themselves.	Answer accepted
GIH	2	RIC	3P6-DSD-ESO-754-0001	p.17/4.2	the assured positional accuracy in all axes by the manufacturer is 10 microns	JAL	That's correct for the full range of the encoder (500 mm travel) and in all the possible conditions of the machine. For a small range (80mm travel) and under controlled conditions we can reach 2 microns. In fact we made some test using and external measuring device to compare the encoder readout.	Answer accepted
GIH	3	RIQ	3P6-DSD-ESO-754-0001	p.19/2.	how was centered to better than 1 micron	JAL	We used a 2 micron resolution comparator touching the drill while turning. We simply push and pull sligtly on the side until the drill turns without excentricity(no apparent movement at the needle of the comparator).	Answer accepted
GIH	4	RIC	3P6-DSD-ESO-754-0001	p.22/6.2	glueing of the lens will be difficult as the space between the tool#1 plate surface and the ferule is less than a mm. Glue can fix both parts.	JAL	This is not difficult, you simply displace tool #1 arm to the side and apply a thin layer of optical cement to the ferule. After you position the arm inside and snap the rod lens. Now you can position the lens. Please note that, before curing, the optical cement used behaves like oil, facilitating the sliding and seating of the lens over the surface.	Answer accepted
AKA	1	RIQ	INS-04/17	all	Have you considered to try to feed the laser light needed for the alignment of the head in to the bare fibre where the polimyde coating was removed. The laser light will mostly travel in the cladding and not in the core of the fibre - but this might be sufficient for the alignment process.	AGI	We did a quick test, injecting laser light in the bare fibre but we did not manage to get light transmission.	Action Item Nr. 1 and Action Item Nr. 4
AKA	2	RIQ	INS-04/17	all	For all three methods: is it know what the impact on the Focal Ratio Degradation will be ? The FDR is a key parameter when talking about high efficiency fibre links but not mentioned here.	GLC	!!!!

AKA	6	RIC	3P6-DSD-ESO-754-0001	Sect. 3.1, Fig 2	Wouldn't it be advisable to have a mechanical protection of the rod lens to prevent the shutter blade from hitting it in case of misalignment of the blade ?	JAL	It's a good idea, however you have to consider that we have very little space between the plate and the rod lens (770 microns). After gluing the rod lens it might be possible to add a pair of glued rings on the lens seating plane with a height approximately the lenght of the rod lens, a sort of protection tube around the lens.	Action Item Nr. 3
AKA	7	RIQ	3P6-DSD-ESO-754-0001	Sect. 7	Why have you not planned for a coating - in particular for a high-efficiency fibre ?	GAV	Anti reflection coating centered at 450nm is planned. We will add this to the document.	Answer accepted
AKA	8	RIC	3P6-DSD-ESO-754-0001	Sect. 7	Fig. 15 and 16 are swapped	GLC	Will be corrected	Answer accepted
AKA	9	RID	3P6-DSD-ESO-754-0001	Sect.7	The spots fill the 100micron fibre diameter. In Sect. 2.2 it is said that you would allow for 5% decentering, I.e. the pupil should be 95micron diameter. Pls. clarify.	GAV	What is said is that we allow 5% flux losses. The pupil is 95.2 microns in diameter: 770/8.09.	Answer accepted
AKA	10	RID	all		What I am missing in the FDR documentation is the estimate on the final throughput of the new fibre system to demonstrate that the requirements can be achieved. I have not studied the PDR documentation (and I assume that I would find it there). However, since there are some changes in the design, an update of this efficiency breakdown is essential for a Final Design Review.	GLC	The final throughput will obviously be heavily affected by the material properties of the fibre and by its diameter. Unfortunately we do not have a choice on the fibre. It was installed during the HARPS assembly, and to install a new one would require to open the vacuum vessel, which is not an option (cfr. user requirements). The new fibre however is made of the same material of the standard HARPS fibre but has a larger diameter. Using the diameter of the new fibre as a driver, in the user requirements (sect. 4.1) it was specified that, for example, the flux gain with the new fibre should be of 78% with a seeing of 1". A fiber throughput should be included as part of the FDR.	Action Item Nr. 4
BBU	1	RIC	3P6-DSD-ESO-754-0001	6.2	For tool #1, instead of using manual micrometers have you foreseen to use more sensitive device like micro stepping motor. (Picomotor from NewFocus not very expensive)	JAL	We don't, for sake of simplicity we decided to use manual devices. Additionally we found that the manual devices are perfectly suitable for our needs. In fact we mounted the linear stage together with a 2micron resolution comparator to, among other things, test the resolution of the movement. When moving the screw the needle of the comparator moves accordingly and smoothly between the 2 microns divisions in the dial.	Answer accepted
BBU	2	RIC	3P6-DSD-ESO-754-0001	6.4	I assume that during the cementing the fibre has to be push in contact with the lens. How do you proceed.	JAL	Before gluing the rod lens the fiber is glued into the ferule and the ferule front plane is polished together with the fiber, thus the fibre end and the ferule plane becomes perfectly coincident. While gluing, the rod lens is kept positively in contact with the ferule plane by the spring action of the arm.	Answer accepted
BBU	3	RIC	3P6-DSD-ESO-754-0001	6.5	What is your tolerance on the Z=770 micron value. Do you consider a certain thickness of cement that will increase the Z.	JAL	Before gluing the ferule into the head Z is adjusted by means of the threaded inserts, the adusting range is +/-300microns around the nominal position.	Answer accepted

BBU	4	RIC	3P6-DSD-ESO-754-0001	6.4	How do you align the pupil projection screen before starting the alignment of the lens.In the appendix you claim to be able to measure a decentering of 0.6mm, but how accurate can you set your target screen. Same question for 6.5.	AGI	Without lens the ferrule will be mounted on a vertical bench with a projection including diferent concentric ring. With the back illumination laser the F/4 beam of the fiber exit will shine the screen aligned then with the beam. Then the lens is mounted(cemented) with the new F/8 bench centered. A small decentering is easlily measured on the screen	Answer accepted
BBU	5	RIC	3P6-DSD-ESO-754-0001	6.4	Instead of using a laser for the back injection in the fibre which give a lot of speckle and a not very well define pupil edge have you considered to use a non coherent source.(Halogen lamp with or without color filter)	AGI	This kind of source is too faint … The laser beam is used to figure out the beam location. Inside speckles are not critical. This method has been used successfully on all other fibers (CES and Feros)	Answer accepted
BBU	6	RIC	3P6-DSD-ESO-754-0001	6.4	Do you have plan to do efficiency measurement of a dummy fibre cable with a similar lens, and to check the scrambling efficiency by projecting a pupil at the fibre entrance.	AGI	The fiber bundle is mounted on Harps and cannot be changed. The fiber light injection is different than used on HAM (pupil instead of star projection). The efficiency can differ from one fiber to another, the final fiber link efficiency could be measured only on stars. Furthermore this fiber and lens type are in use on Feros without problems. This fiber will have no scrambler (reduced throughput)	Action Item Nr. 4