DISCLAIMER

Note that this is an example proposal for training purposes only.

This guideline proposal is ***not*** *a perfect template of how to write a proposal, rather a tool and an example of how to compile, present and provide information in the proposal template such that all expected elements are present for effective evaluation.*

Due to its nature, the proposal is not fully complete, in a number of sections an example of how to complete the section is given rather than the full section. For example, Work Package Descriptions, CVs etc.

Anything appearing in a text box like this is an additional training note – not part of the document.

The topic and content of this example proposal is not relevant in the context of any ESA ITTs, and should not be copied for such purposes.

TITLE OF THE PROPOSAL: Development of Next Generation Hot beverage Production Unit

PART 1 TECHNICAL AND APPLICATION PART

1.0 INTRODUCTION AND SCOPE

Hot beverage production has experienced a revolution in the last 10 years, where the demand for a billion cups of coffee brewed daily worldwide (ref) has increased the market dominance of big coffee maker chains largely due to the large output and easy operability of the custom coffee machines, which are often unavailable for smaller companies. However, recent increase in consumer awareness and demand for ever-increasing variety in choice and quality provides an opportunity for the resurgence of high-quality coffee providers and creates the need for new and competitive solutions for the production of hot beverages. Further, technological advances in high pressure systems and autonomous systems could offer significant improvements in hot beverage production, while addressing such consumer needs. Taking into consideration the known parameters and procedures defining the quality of coffee, and utilizing recent technological improvements (particularly in the areas of autonomous systems, microdiffusion and the safe handling of high pressure systems) in conjunction with COTS components, allows for a rapid development of a competitive and efficient next generation hot beverage maker which will be able to successfully compete with and improve on those used by the currently dominant large coffee shop chains. The availability of such a product will help to save the increasingly under pressure independent retailers.

1.1 TECHNICAL OBJECTIVES:

We propose to develop a fully automated, high efficiency Hot Beverage Maker (HBM) named 'Coffee Master 2000', up to and including a prototype fully representative of the final product. For a commercially competitive development, such design improvements will be realized within 18 months. The Coffee Master 2000 shall be more efficient and versatile than currently available machines, as well as competitively priced, with the aim of a final product with a recurring cost of less than 2000 Euros delivering beverages at a cost of less than 25cents/cup.

1.2 REQUIREMENTS:

Preliminary technical requirements to satisfy the objectives of this activity are outlined in Table 1.

Requirements RCM1 and RCM7 are considered to be key to achieving the set objectives, defining the expected output (efficiency) and the cost (competitiveness) of the hot beverage production unit.

The key design drivers are RCM2,3,4,6 and 11, as the design trade-offs to address these will have the largest influence on the main elements of the unit. These requirements influence the size and number of storage tanks for liquids and solids (RCM2, 3), the required performance of the pump and boiler (RCM2,6,11) as well as the dispenser, control panel and software of the unit (RCM2). Consideration of materials and the trade offs of COTS components against increased reliability and optimal cost is defined in RCM4 and RCM6. The parts cost and quality will have to be carefully considered during the initial design and trade off work, in order to stay within the recurring cost target set in the objectives.

The hot beverage maker must be connected to a water system independent of the unit as defined by RCM3 (refills).

RCM4 (Reliability) means a full reliability assessment on system level must be carried out, as well as consolidation with customer regarding iteration of the requirements and assessment of the performance of current market leaders. Subsequent development of detailed lower-level requirements is considered critical. Increasing reliability comes at the cost of more expensive parts which may be critical considering the recurring cost. Thus, careful analysis and multiple trade-offs will be required during the development.

The Certified Italian Espresso Coffee quality requirements have been shown to have a strong positive correlation with consumer satisfaction (EU Multinational Coffee Cohort Study ISBN 978-3-16-148410-0; further discussed in section 1.1.4). These quality requirements are considered an important prerequisite to develop a beverage maker which can produce objectively tasty beverages.

Compliance with the new EU hot water handling safety standards (issued EU-STT n. 214: 24 July 2018) listed in EU/HotWater-safety/001 v2, is now essential for any unit offered for sale within the EU, as defined in RCM 12.

While this represents our first iteration and interpretation of the requirements, a final consolidation of requirements will be performed in the first stages of the activity (WP200) and agreed with ESA at the Requirements Review.

Table 1: Technical Requirements

No.	Req.	Discussion	Verification
RCM1	The HBM shall be capable to produce at least 24 beverages per minute with one operator.	This requirement is key to ensuring the competitiveness of the customer. It will be possible to prepare 4 beverages simultaneously giving 24/min. Some beverages (e.g. Cappuccino) will take up to 10 seconds, whilst others may be faster (e.g. Tea).	Test
RCM2	The HBM shall be capable to produce at least 15 different beverage types including variations of: Coffee Tea Hot Chocolate	Key design driver affecting the need for dedicated storage and dispense units for the different raw ingredients of the beverages. In order to comply with RCM1, a dedicated boiler for simultaneous milk frothing must be included in the design. The unit shall provide the necessary components (hot water and a tea bag) and will not produce ready-to-drink tea beverages.	Analysis and Test
RCM3	The HBM shall be capable of producing at least 1000 beverages between refills (minimum of 500 for any one variant).	Key design driver affecting the size of dedicated storage units. This requirement means the HBM has to have the capability to be connected to a water supply network. Given that the optimal amount of coffee per cup requires 15cm3 of beans, the maximum sized storage unit still compliant with RCM5 and RCM6, would produce 1000 bean-based beverages (coffee or cocoa). Similarly, the amount of tea bags stored can be maximum 500.	Analysis and Test
RCM4	The reliability of HBM shall comparable to current market leading machines with an MTBF of at least 10,000hrs	Comparable system-level reliability with current models on the market.	Analysis

RCM5	The HBM shall be able to be carried and installed by 2 people without special lifting equipment.	This requirement does not exclude special tools for the installation under the condition that they are included in the recurring price of the unit.	Analysis and Test
RCM6	The HBM shall have a recurring cost of less than 2,000 Euros	Preliminary cost estimation 1700 (+/-300) EUR. Note that this is dependent on the RCM4.	Analysis
RCM7	The running costs of the HBM (excluding the salary of the operator) shall be less than 0.2 Euro per beverage.	This requirement is key to ensuring the competitiveness of the customer.	Analysis
RCM8	The HBM shall be compatible with a standard 240v power supply.	A standard requirement for use is Europe.	Analysis and Test
RCM10	The HBM shall produce beverages compliant with the requirements of the Certified Italian Espresso Coffee quality	As defined in Standard Italian Espresso Coffee Certification (certificate of product conformity Csqa n. 214: 24 September 1999, DTP 008 Ed.1). This requirement has implications for the pressure system design.	Test
RCM11	The HBM shall be compliant with the pressure test and safety requirements of AD1	Design implication for high pressure component.	Test
RCM12	The HBM shall be compliant with the EU hot water handling safety standards listed in EU/HotWater-safety/001 v2	Compliance with this standard is mandatory to be able to sell the unit in the EU	Test

1.3 TECHNOLOGY READINESS LEVEL:

The Coffee Master 2000 will be based on our Patent #1234 for software controlled super-automation process of coffee machines, which uses high pressure steam and fully automatic end user programmable software settings to enable the optimal and rapid production of more than 5 types and variations of hot beverage.
The current technical maturity is identified as TRL 3. A breadboard has been built and has demonstrated the proof of concept of Patent # 1234. This further ensures our development is a low-risk approach. The aimed technical maturity to be reached by the end of this activity is TRL 5, for a functional, fully representative prototype.

1.4 ENGINEERING APPROACH

1.4.1 State of the Art

The current state of the art in commercially available coffee machines is based on the following technologies:

- Volumetric pump (exit water pressure 9 ± 1 bar)
- Boiler (heating element 1000-2000W) with heat exchanger
- Blade grinder (manual setting for two modes of granularity)
- Simultaneous double dispense nozzle

The state of the art model commercially available today is the Caffeine Blaster 100 (CB100) as used by Star Clucks – the market leader in this area. The Caffeine Blaster 100 can prepare 10 different types of coffee and can prepare 2 cups simultaneously with 1 operator.

The Caffeine Blaster 200 (CB200) is currently in development and scheduled to be released in 6 months. The CB200 can prepare 12 different coffee types and 4 simultaneous beverages with 1 operator. Other coffee production machines are the protected property of the provider (e.g. Lotsa Coffee) and not for sale to competitors.

The CB 100 and 200 require an operator with specialized training, thus increasing the operational cost of the unit. Further the CB models are based on single blade grinder and do not offer the innovative regulation of caffeine content in the beverage, and thus fail to address recent market trends (see section 1.4.2). Our chosen baseline utilizes the concept of super-automation, negating the need of an operator. Further, a programmable double burr grinder can provide variable granularity and thus controlled caffeine extraction from the beans, allowing for fully customized control of the total amount of desirable bioactive compounds in coffee. Additionally, the novel approach of a dedicated cocoa bean grinder further responds to recent market demand for wholesome, unprocessed products. We propose to also incorporate an automatic nanofoamer for milk frothing, currently not incorporated in the commercially available state of the art technology. The nanofoamer provides higher reliability, higher throughput and a finer quality of foam than traditional methods. The total throughput of the proposed baseline design of our proposed CM2000 design exceeds the performance of CB200 by up to 20% through our patented super-automation technology and offers 25% more product variety to the customer.

1.4.2 <u>Technical Steps</u>

The technical steps are also shown in overview in the work logic flow diagram given in section 1.7.1

Step 1: Market Survey
As a first step, we intend to carry out an exhaustive market review to determine the exact performance factors of currently available hot beverage makers and to capture the consumer needs and wishes. A detailed market survey will be carried during WP201 out to assess the aspects below, a first iteration of this is given in the following sections.

a) Capabilities and performance parameters of HBMs available on the market. This shall include information on cost (recurring, maintenance and running costs), reliability analysis (full assessment of continuous operation of 10 000 hours, including Mean Time Between Failures, Mean Time To Repair etc), efficiency analysis.

b) Current market demand and trends for different hot beverages, including, but not limited to end-user preferences for caffeine content, aroma, milk foam and none-dairy alternatives.

Our preliminary assessment of the existing market leading HBM capabilities has identified the average capabilities of HBM to address the standard Espresso Coffee (EC) requirements, providing maximally up to 2 cups within 20 seconds (+10 sec depending on requested beverage). Key performance drivers have been identified as boiler setup (single/double/heat exchange) and bean grinder efficiency (average efficiency 60%). These factors have been taken into consideration for our baseline design and will be iterated further upon completion of full market analysis.

Coffee is composed of over 1800 different chemical components [ref]. Due to the complex chemistry, identification of correlations between physical parameters of the extracted solutes and the perceived quality of the coffee beverage is a nontrivial matter and largely up to personal preference. The brewing process is considered to affect overall coffee quality via three parameters: pressure, time, and turbulence during the extraction. Additional factors, such as grind uniformity and milk foam density, are further defined by the HBM design. Thus, identification of consumer preferences and behaviour are pivotal for the production of a competitive HBM. Studies of recent consumer trends (ref) have uncovered a new varied preference in total caffeine content of coffee (50-250mg, 50mg increments preferred). Our preliminary assessment has further identified a clear preference towards drinks containing coffee constituents (organic acids, Maillard products and heterocycles) at 6 to 10 percent by mass. The amount of bioactive compounds in coffee is a function of the granularity of the beans, which can be achieved with a burr grinder with fine control settings.

The consumer preference for milk density has increased by 200% in the last 10 years, with nanofoam being the most recent development, however a dedicated nanofoamer has not been yet incorporated into HBMs and milk foaming remains a manual task.

The aroma plays and important role in sensory flavour perception, as well as directing consumer behaviour and preferences. The particular aroma of EC can be attributed to the presence of surface foam, which traps the volatilized aromas and doses their emission into the atmosphere (ref). The generation of such foam has been shown to be dependent on the extraction temperature of EC, with optimal temperature regarded as 92 C (ref), corresponding to Certified Italian Espresso Coffee requirements.

The global demand for hot cocoa based drinks has remained stable over the last 10 years, but consumption has increased for bean-based fresh cocoa and reduced for ready-powder cocoa (ref). Similar trends can be seen for tea, where granulated tea consumption has reduced by 70% and organic teabag and loose tea consumption has doubled. Similarly there are trends for more non-dairy options (e.g. soja, oat or almond milks).

Based on these preliminary investigations, we aim to tailor the HBM corresponding to the Certified Italian Espresso Coffee requirements, further incorporating a custom burr grinder to address different caffeine levels and a milk nanofoamer. Given the market trends, hot cocoa beverage shall be offered from bean form and tea varieties can be provided as regular tea bags dispensed by the HBM. In order to remain adaptable to what are rapidly changing market tastes, the ability for full automation and full customisability of each pre-programmed beverages is considered key and is included in our design.

Step 2: Requirement Specification

Based on the lessons learnt from the detailed market survey, the preliminary requirements iterated in this proposal will be further refined and complemented with additional requirements (if applicable) for the full development of CM2000 (WP 202). A full requirement specification will be produced, covering functional, performance, reliability, cost and usability requirements, subject to acceptance by ESA at the Requirements Review.

Step 3: Conceptual design

The initial high level conceptual design for the HBM (provided in section 1.4.3) will be revised and updated addressing the final completed requirement specification. A preliminary trade-off analyses will be performed and key subsystems identified for the HBM in the form of a functional block diagram. Detailed requirements for each subsystem will also be derived such that work on them may proceed in parallel in later steps. The high level concept will be presented at the Requirements Review along with the requirement specification. As part of WP203 (Concept design), a preliminary breadboard test plan for functional performance will be defined in order to de-risk the key critical aspects of the design.

Step 4: Preliminary design

WP304-WP306 cover the elements for the preliminary design of the HBM, based on the conceptual design developed and agreed during WP203. This shall include a preliminary performance assessment and trade-off analysis, breadboard definition and design, component selection and breadboarding of key elements, followed by breadboard testing and analysis. The purpose of the Preliminary Design Review shall be to review the baseline design and the breadboard demonstrator test results for completeness and for compliance with the agreed requirements. Detailed specification and prototype test plan shall be agreed at the PDR.

Step 5: Detailed design

Hardware and software design activities will run in parallel as part of the detailed design phase, encompassing all HBM sub-systems, expanding on the detail and depth provided in the preliminary design. In particular, the Mechanical Design, the Electrical Design, the Software Design, the Man-Machine Interface and operational concept and the water and pressure system design will be determined.

Step 6: Prototype development and test

A prototype of the final design shall be manufactured and tested according to the test plan agreed at the PDR. Preliminary functional and subsystem tests shall be performed already during the development phase and comprehensive prototype testing will be performed prior to the Critical Design Review. The purpose of the CDR shall be to review the final design and prototype test results for completeness, correctness and compliance with the requirements.

Experience from and lessons learnt during procurement, manufacturing, and assembly, as well as during the test campaign will be collected and relevant documentation and procedures updated. Final consolidation of proposed changes shall be reviewed by the end of development activity at the CDR.

Test Plan

Given our proposed baseline design (see section 1.4.3), the following non-exhaustive list of tests are considered as minimum for prototype testing:

Functional testing
Electrical testing (IEC 60530 Standard)
Performance testing (as outlined in ASTM F2990 Standard Test Method for Commercial Coffee Brewers, Book of Standards Volume: 15.12) including but not limited to:
- Pressure testing
- Temperature testing
- Heating up and cycling time, water flow testing

Environmental testing

It is considered that CE-testing will eventually be required for marketing within Europe, but this is considered out of scope for the present activity.

1.4.3 Implementation aspects

The preliminary market assessment that has been carried out during the writing of this proposal (discussed in Section 1.4.2) forms the inputs to the basis of the proposed baseline design. In response to our findings the requirements shall be updated, completed and agreed with ESA during a requirements review at the completion of WP203. The agreed updated requirements will be taken into account and reflected in the updates to the proposed baseline design.

Baseline design

Preparation of a standard pressurized coffee brew or espresso coffee (EC) requires the grinding of coffee beans, pressure generation with a volumetric pump and heat exchanger (or boiler) for reaching the precisely regulated required temperature needed to facilitate the ideal percolation of a pre-determined (per beverage type) amount of hot water through a ground coffee cake in an optimally short time. Standard EC machines are semi-automatic, with the required manual insertion of the ground coffee and manual frothing and dispense of milk. Our solution fully automates the entire process thereby saving time and money while increasing beverage quality and flexibility. All aspects of the process will be fully configurable and automatically controlled in order to ensure any permutation and combination of ingredients and processing.

We aim to develop Coffee Master 2000 hot beverage production unit, based on our Patent #1234 for software controlled super-automation process of coffee machines, which uses high pressure steam and fully automatic end user programmable software settings to enable the optimal and rapid production of more than 5 types and variations of hot beverage. It is capable of producing 4 ready-to-consume beverages simultaneously without the need of a specialized operator.

The following key adaptions will be further incorporated to achieve the objectives:

i. Heavy duty programmable double burr grinder to control granularity of the beans (coffee or cocoa), enabling further control of caffeine levels and increasing the beverage variety up to 2-fold. This further affects percolation speed and thus can decrease total brewing time by 15%.

ii. Dual-superboiler system for the simultaneous dispense of hot beverages utilizing both water or milk (and alternatives) reservoirs, as required, increasing the potential beverage variety another 2-fold.

iii. Nanofoamer capable of producing milk foam with bubble size of less than 20microns.

A functional diagram of the CM2000 is given in Fig 1.

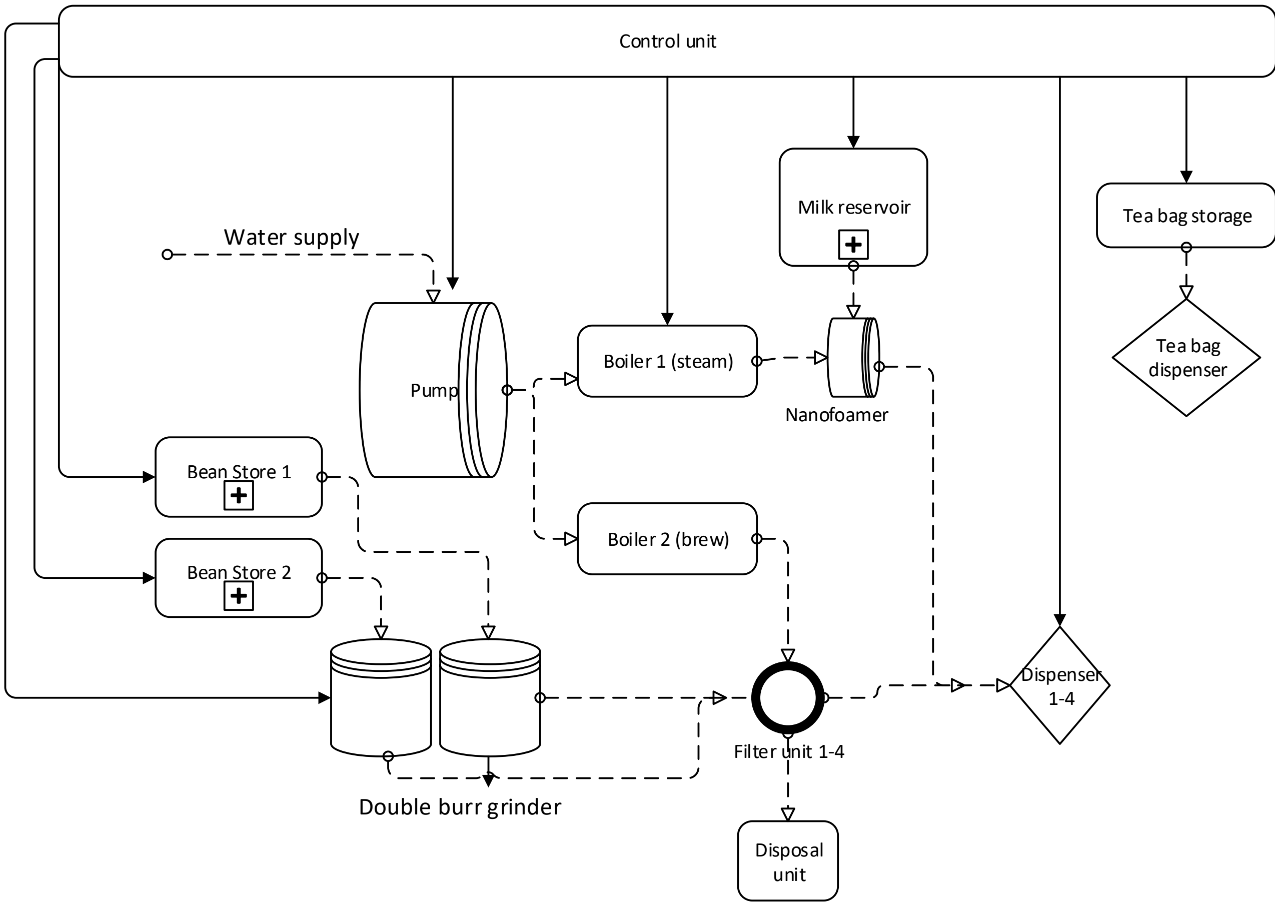

Figure 1. Functional Diagram of CM2000

The CM2000 process flow is as follows:

- The user requests a drink using the control panel button with options for hot beverages and desired volume. This includes a large number of pre-set options enabling one touch ordering as well as full customizability.
- The machine will automatically estimate the amount of beans (or mix of beans) required for the drink. The beans will be ground to the required granularity according to the requested drink.
- If the requested beverage is tea: hot water and selected tea variety will be dispensed in tea bag form directly into the cup.
- Ground beans will be directed to a filter unit where pressurized and temperature controlled water will be used to extract the beverage. Percolation time is also set and controlled.
- During brewing, a dedicated steam boiler will be used to produce milk (or selected substitute) nanofoam, which shall be simultaneously dispensed with the hot beverage at a volume determined by software according to the type of drink requested by the user. Syrups may also be added directly to either the cup or the milk/ foam.
- Utilized ground solid cake is automatically dispensed and filter unit rinsed.

Trade-off analysis

A high level trade-off between a super-automated high pressure system based on our patented software process and a semi-automated high pressure system has been carried out as part of the proposal. The following parameters were considered:

Efficiency (preparation time and throughput)

Semi-automatic HBMs require an operator for manual milk frothing and bean granularity setting. Super–automation decreases the time of any bean-based beverage production by 60% (5 +/- 2sec) by simultaneous milk frothing during coffee brewing and a further 10% by simultaneous dispense. Further, software controlled bean grind settings negate the need for manual adjustment, further decreasing total preparation time.
Semi-Auto: 0
Super-Auto: ++

Running cost

The increase in efficiency does incur higher power consumption than semi-automatic units due to additional electric components. However, such cost is offset by the lower cost of operation of super-automatic HBMs (training, safety and salary of the operator will not be required).
Semi-Auto: 0
Super-Auto: +

Variety

Due to the manual bean granularity setting with limited options, differential caffeine content is not offered in most semi-automatic HBM units. Super-automation can integrate this innovation seamlessly in conjunction with a high performance burr grinder, offering at least 2-fold more coffee variety to the customer.
Semi-Auto: -
Super-Auto: ++

Risk

The use of super-automation negates the operational and health and safety risks commonly reported for semi-automated units. However, the dedicated software adaption does incur higher development risks and potential software security risks during operation.
Semi-Auto: +
Super-Auto: -

Recurring Cost

The software component of super-automation system will inflate the recurring cost of the HBM unit (10-15%) due to patented technology.
Semi-Auto: +

Super-Auto: -

On the basis of our high-level trade-off, the proposed baseline design utilises our patented super-automation processes with additional modifications to allow for increased efficiency while responding to the preliminary market assessment (Section 1.4.2)

During the conceptual design in WP203 the following key trade-offs need to be performed:

- Nanofoamer foam size with regard to power consumption, and throughput.
- Burr grinder material selection (stainless steel, carbon steel, ceramic) with regards to durability, predicted lifetime and cost.
- Pump selection (vibratory vs. rotary). Parameters to be considered:
    - Materials: availability, sterility, durability
    - Power consumption (in startup/standby modes)
    - Lifespan
    - Pressure generation and stability
    - Performance metrics (speed, noise)

Detailed trade-off analysis and risk assessment shall be carried out following the Requirements Review on the basis of the requirement specification and agreed conceptual design.

1.5 TECHNICAL FEASIBILITY, PROBLEM AREAS AND DEVELOPMENT RISK :

Note that section 1.5 can be included as a discussion. Or – as we have done here – addressed in tabular form. Which is better depends on the issues and amount of discussion and explanation needed.

Table 2. Potential Problem and Risk Areas

Problem	Short description	Impact	Mitigation	Prevention
Incompatibility of the pre-existing super-automation software with the new hardware	Patent #1234 covers the main functionalities (estimation and control of bean/water volume, pressure, temperature, pump). Additional functionalities such as fine control of burr grinder and nanofoamer need to be incorporated.	High	Early testing on representative hardware (BB). Software rebuild and increased resource allocation for BB to Prototype phase.	Our patented software has been built using modular programming principles for the foreseeable adaptions in mind. Rigorous unit-testing during development is foreseen prior to integration. Comprehensive integration plan and testing.
Manufacturing quality of double burr grinder blades	Consistent component quality for the accurate estimation of bean granularity is essential	Medium	Swop suppliers according to prevention measures.	Identification of multiple high-end producer of stainless steel products with minimally ISO 9001 system certification. Detailed supplier assessment and audit.

Nanofoamer cannot produce bubbles of less than 30microns at the set power limits.	Creation of bubbles less than 30microns, might increase power consumption to excessive levels.	Low	Relax the requirement to 40microns or 50% efficiency.	Design replaceable foam inducer head for the foamer unit with an option to size up to 40micron bubbles. Early testing of the nanofoamer.

1.6 APPLICATION OF TECHNOLOGY DEVELOPMENT

Make sure to provide evidence to show that the objectives of the activity meet the criteria of the call as outlined in the Cover Letter of the ITT. It has not been done in the present proposal since it does not correspond to a specific Cover Letter.

The prevalence of coffee shop big name chains (e.g. Star Clucks), with their custom hot beverage machines have made it difficult for independent and private companies to compete. This is largely due to the unavailability of high end, high efficiency, reliable and flexible hot beverage production units on the market. There exists therefore a clear market opportunity which needs to be filled. There is a perceived opportunity to spin out space experience in high pressure systems, high reliability systems and autonomous systems into this market. From our preliminary market assessment, it is clear that such technologies could lead to a revolutionary breakthrough in HBM technology that, if available on the open market, would revolutionise the coffee shop industry, see a resurgence in privately owned coffee shops and bring a large socio-economic benefit.

We have identified 5 small privately owned coffee shops in 3 major European cities (Amsterdam, London, Paris), who have showed interest in the proposed development. Considering the customisability and easy operability of the HBM, large companies and governmental organizations have further expressed their interest in the development, for supplying local and international offices. The letters of intent have been included in Annex.

1.7 TECHNICAL IMPLEMENTATION / PROGRAMME OF WORK

1.7.1 Proposed Work Logic

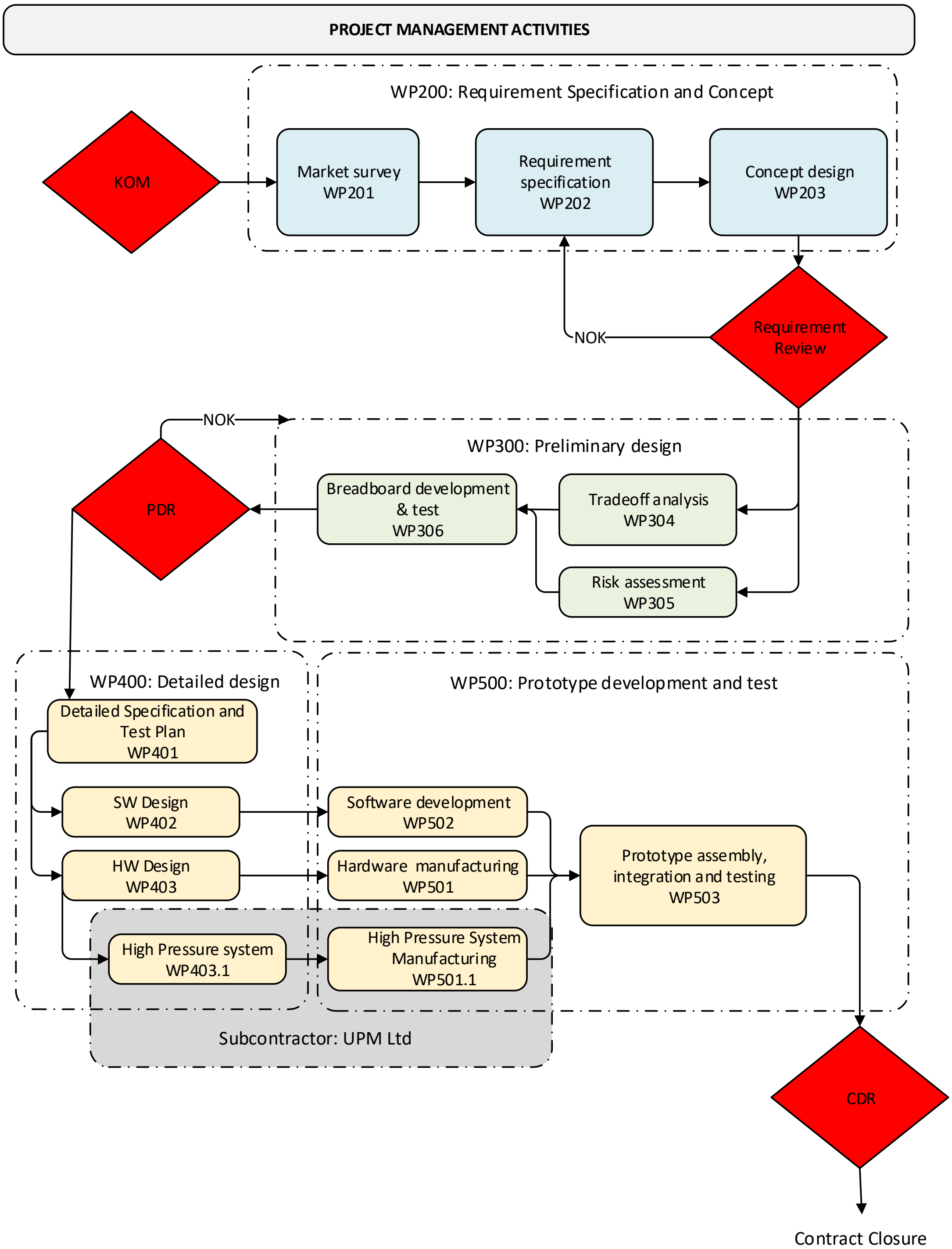

Figure 2. Work Flow Logic

1.7.2 Contents of the proposed work

1.7.2.1 Work Breakdown Structure (WBS)

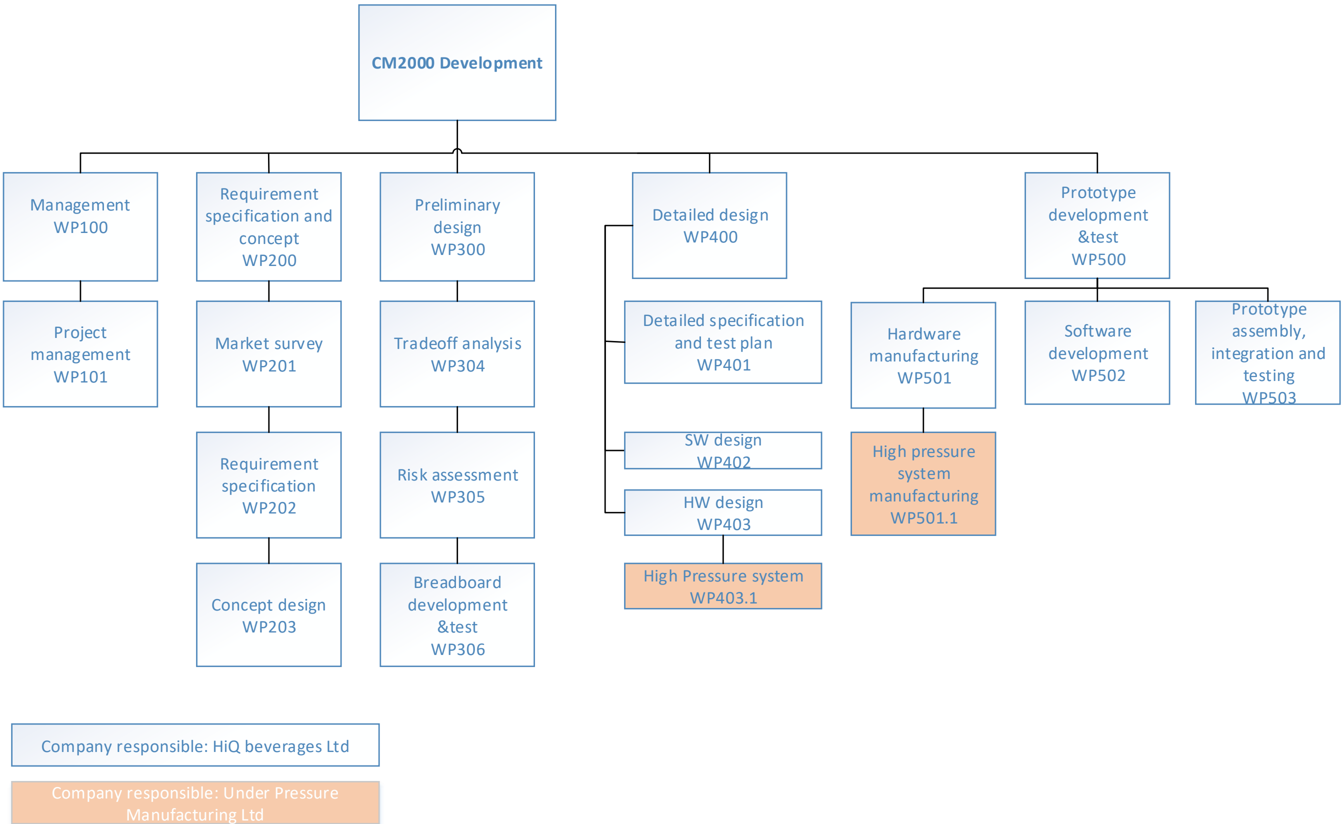

Figure 3. Work Breakdown Structure

The sub-contractor, Under Pressure Manufactuing Ltd, shall be responsible for WP403.1 (High Pressure system design) andWP501.1 (High Pressure system design and manufacturing),
All other work packages under this activity are under the responsibility of HiQ Beverages Ltd.

Note that here we have purposefully included 3 different styles of presentation of the WBS in one diagram for illustrative purposes. Please stick to just one style for your WBS.

1.7.2.2 Work Package Description (WPD)

Note that we have only included one example WPD – the proposal should include all WPD and these should be at the same level as the WBS (i.e. 1 per smallest element of the WBS). Try to keep each WPD to 1 page for readability

<table>
<tr><td>PROJECT: CM2000 Development   PHASE: 1</td><td>WP: 201</td></tr>
<tr><td>WP Title: Market Survey

Company: HiQ Beverages Ltd
WP Manager: Mr. Bean

Start Event: KOM   Planned Date: T0
End Event: RR   Planned Date: T0+3</td><td>Sheet 1 of 1

Issue Ref: 1

Issue Date
15.08.2018</td></tr>
<tr><td>Inputs:
SoW
Approved proposal
KOM Minutes of Meeting
AD1
RD1
Tasks:
Perform a survey of all current HBMs available on market
Compare key requirements and capabilities
Compare key performance indicators (efficiency, lifetime, reliability)
Compare and analyse cost (unit cost, running cost)
Identify and analyse customer requirements (coffee provider)
Assess the current annual demand for hot beverages in Europe
Perform trend analysis for hot beverage demand in Europe
Identify most popular hot beverages and key end-user requirements
Collect and analyse new and emerging requirements for popular hot beverages
Assess the potential future market for any evolving requirements
Identify consumer needs not currently addressed by HBM
Specifically Excluded Tasks:
No competitor machines will be procured and tested
No taste testing/ surveying will be performed
Outputs:
D01: Current and Future Market Assessment Report
D02: Emerging Hot Beverage Requirement Report</td><td></td></tr>
</table>

1.8 BACKGROUND OF THE COMPANY(IES)

Prime contractor: HiQ Beverages Ltd

HiQ Beverages is one of the leading process innovators ion Eastern Europe in beverage production software and machinery. Founded in 1990, the company has more than 20 years of experience in specialized beverage production systems and over 10 years of experience in automation software. We specialize in full automation software for liquid mixing and dispension, for which we hold multiple patents (Patent #1234, Patent#5566).

We are dedicated to research, development and manufacturing of small to medium scale beverage handling and production units to customers worldwide. Our products are in accordance with international quality standards and we have ISO-9001 certification since 2007.

HiQ Beverages Ltd customers include market leading soft drink producers (Not-A-Cola Company, Sipsy Co).

HiQ Beverages Ltd has a current staff of 125 and is considered a Small and Medium-sized Enterprise (SME).

Subcontractor: Under Pressure Manufacturing Ltd (UPM)

UPM has 30 years of experience in the design and manufacturing of high pressure systems and ancillary components (valves, fittings, tubing) to the highest quality standards.

UPM is ISO 9001 certified company and a preferred supplier within diverse markets such as tooling (waterjet cutting and cleaning, pneumatic tools), oil and gas, chemical and petrochemical, and food and beverage industry.

1.9 FACILITIES

All the required facilities for the proposed work are available to the prime and subcontractor. HiQ Beverages Ltd operates on Unix-based OS with internal servers and has the full software licenses (RoboQ, EXent 5.0, SinTouch) required for the foreseen work. HiQ Beverages has a full mechanical workshop, in-house pressure test chamber and a lifetest facility.

Under Pressure Manufacturing Ltd has the required hardware manufacturing facilities for the foreseen work, including steel cutting and stamping machinery, as well as qualified welding operators and equipment.

See Annex for details on specific equipment available to the prime and subcontractor.

Critical performance testing shall be carried out in Brewzone, Italy at ASTM F2990 Certified Commercial Coffee Brewers Testing Facility. A quote for the required testing has been requested and the testing facility has been confirmed to be available for the timeframe envisaged in the proposal.

PART 2 MANAGEMENT PART

2.1 TEAM ORGANISATION AND PERSONNEL

2.1.1 Proposed team

The project team is led by the prime contractor HiQ Beverages Ltd, with Under Pressure Manufacturing Ltd as a subcontractor. The subcontractor is required due to their extensive expertise and heritage in high pressure systems design and manufacturing and will be responsible for the design of all the high pressure components of the CM2000. Under Pressure Manufacturing Ltd is the leading expert in Eastern Europe for high pressure system design and manufacturing. Such expertise is not available within HiQ Beverages Ltd. at this stage. UPM Ltd and HiQ Beverages have previous successful industrial partnerships, leading to off-the-shelf products, currently sold across Europe and South-East Asia (Fully Automated Soda Tap – FAST; High-pressure Infusion Tea – HI-Tea). UMP Ltd offers specialized expertise, which is considered essential for the success of this project, that complements the specific competencies of HiQ Beverages.

2.1.1.1 Overall team composition, key personnel

The team consists of 10 people, 4 of which are considered key due to their expertise significant contribution to the key project tasks.

The project manager is Mr. Bean from HiQ Beverages Ltd. Mr. Bean will be the main contact point with ESA as well as the subcontractor and supplier, and will oversee all management tasks and contractual aspects of the project, including sub-contractor management, scheduling, project control and risk management.

Software lead engineer D.U. Code is responsible for developing the main software architecture and proposed modifications to Patent#1234, as well as integration with hardware and co-verification.

Hardware team lead V. Hard oversees the full design, manufacturing and assembly of the full unit.

Component lead engineer A. Rabica is responsible for the design, manufacturing, testing and integration of the high pressure system. A. Rabica further represents the subcontractor UPM Ltd in all contractual matters of the project.

Please refer to section 2.2 for the CVs of all key personnel. Please refer to Figure 4 for full team composition including non-key personnel. Key personnel and participants from prime and subcontractor are highlighted accordingly.

2.1.1.2 Reporting lines within the team

The project manager is responsible for all key decision making aspects of the project and communication with ESA.

The Lead HW and SW engineers as well as the test engineer report to the
PM on all key or decision-making aspects of the project with cost, compliance, scheduling or risk implications.

The lead hardware and software engineers are responsible of the timely execution and performance of their subordinates as defined by Figure 4. The Subcontractor Component lead engineer reports to the lead mechanical engineer for all aspects of the project. Urgent aspects affecting the duration, cost or contractual issues arising from the subcontractor, brought up outside of regular review meetings, will be communicated to the lead mechanical engineer who will report to the PM.

Please refer to Figure 4 for an overview diagram of the reporting lines within the team.

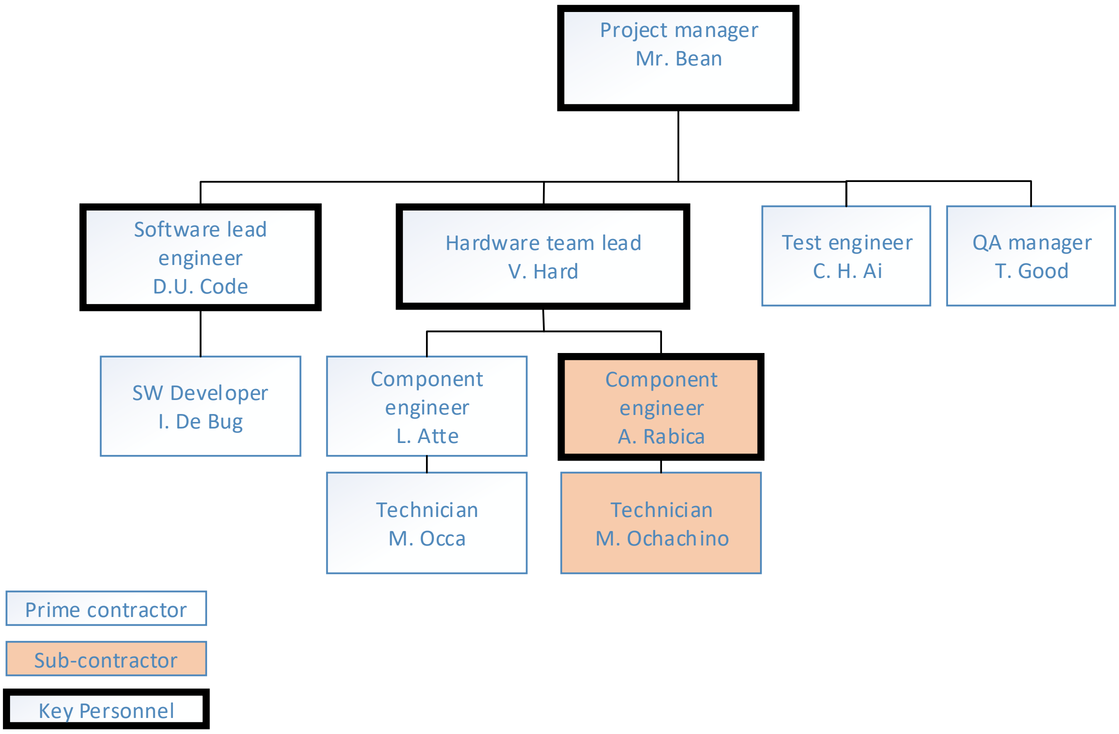

Figure 4. *Project team composition and reporting lines within the team*

2.1.1.3 Time dedication of key personnel

Key Personnel	Total Hours dedicated to the Project	Total Working Hours during Project Timeframe	% of Total Working Hours dedicated to the Project
Project manager Mr. Bean	530	1600	33
SW lead engineer D.U.Code	760	1800	42
HW team lead V. Hard	660	1800	37
Component engineer A. Rabica	240	1800	13
TOTAL	**2190**		

2.2 CURRICULA VITAE

Given below is the resume of the most relevant experience of each key person for the proposed activity. Full CVs are provided in Annex.

Dean Umberto Code (Software lead engineer)

Relevant experience:
2014- …: Software Developer, HiQ Beverages, Estonia

- Software quality monitoring in C++ and SQL in Unix and Linux environments
- Develop automation scripts to test storage appliances in Python and C/C++
- Development of base framework with Java, JSP, Struts, CSS, HTML, JavaScript, Oracle, and MS SQL Server

2008 – 2014: Automation Engineer, Smartest Vacuum Cleaners GmbH, Germany

- Design, development and testing of microcontroller-based embedded systems in Raspberry Pi Platforms using automata-based programming for building smart home appliances.
- Design of protocol stacks for SoC HW/SW Interfaces

2007-2008; Junior Software Developer, Robocop Technologies OÜ, Estonia

- Basic function design in LISP and HDL
- Schematic capture and PCB layout software Design with sensors, encoders, SPI, I2C, CAN and EtherCAT devices

Education:
2005-2007: MSc Technical University Of Matrix, Automation Engineering
2001-2005: BSc Technical University Of Matrix, Computer Science & Mechatronics
Patents:
Code, D.U., "Multi-Layer De-bugger Algorithm" European Patent, N0. 00099851

Note that we have only included one example CV to illustrate the level of detail and tailoring to the specific relevant experience needed – A CV should be included for each key person

2.3 MANAGEMENT PLAN

The foreseen activity is planned to be implemented in line with the management quality standards of the prime contractor HiQ Beverages Ltd., ISO 9001.

The project manager, Mr. Bean, is responsible for all key decision making aspects of the project, communication with ESA and any problem resolution or contractual aspects with the subcontractor. PM is further responsible for the management and organization of the full team, meeting setups, management of schedule and financial aspects of the project. Regular progress reports will be provided to ESA in 3-month intervals.

QA manager, T.Good, monitors and reports to the PM on all decisions that affect any quality aspects of the development. QA management is enforced in an independent manner and upon quality assurance considerations and decisions that conflict or influence the schedule or cost of the activity, ESA will be informed and consulted.

All internal conflicts will be managed through independent assessment on case-by-case basis. All contractual disputes with the subcontractor during project implementation shall be resolved with legal action where necessary.

Team meetings will be held weekly, documented, and followed up keeping an action items list. All members of the project team are foreseen to attend all the team meetings, progress meetings and the internal review meetings. Review meetings with ESA will only be attended by key technical personnel and PM.

Schedule will be monitored by the PM on a regular basis, updated, if required, and communicated to the team members. Appropriate mitigation actions will be proposed upon schedule slippages, and slippages influencing the deliveries and milestones of the activity will be communicated to ESA at earliest possibility.

The PM is responsible for the overall quality and compliance check of all the documentation to be provided to ESA, as well as the timely delivery of said documents. Delivery of sub-contracted work is responsibility of the legal representative of the subcontractor. All sub-contractor deliveries will be presented to project manager for review and finalization for final delivery to ESA.

PLANNING

2.4.1. Gantt chart

Figure 5 depicts the GANTT chart of the project. The major milestones are indicated in red, workpackages 2 and 3, as well as the associated subworkpackages, are indicated in blue and green, respectively, and further correspond to the work flow diagram (Figure 2).

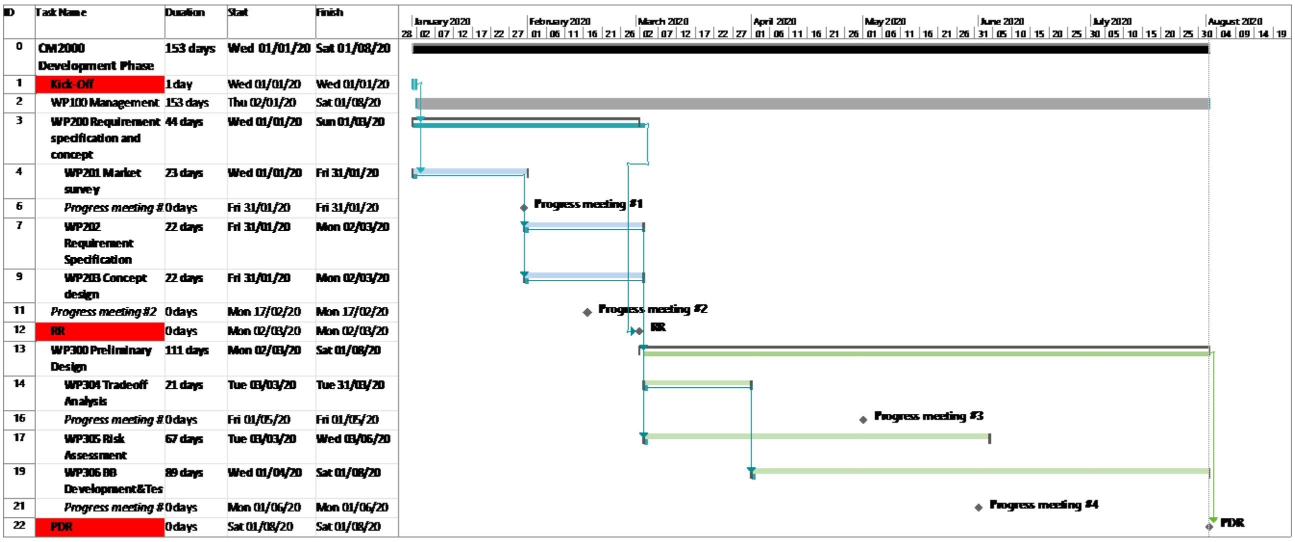

Figure 5. *GANTT Chart*

Note that we have only included the GANTT chart up to the PDR for ease of illustration. The full planning should be presented. If this makes the chart unreadable, consider splitting the planning over two charts (collapsed summary and full).

2.4.2 Proposed Schedule

In case of positive evaluation, the envisaged start date is the in the 1st quarter of 2020, with 1st of January used as a baseline in this proposal. The proposed development is scheduled for completion within 18-months. Thus, the envisaged closing date of the project is the 1st of July, 2021. Based on our proposed schedule, the foreseen timeline of the reviews are proposed as follows:

Requirements Review: KO+2Months
Preliminary Design Review: KO+7Months
Critical Design Review: KO+18Months

WP200 (Requirement Specification and Concept; sub-workpackages WP201, WP202, WP203), is initiated following KOM and is planned to be concluded within 2 months, upon Requirements Review.

WP300 (Preliminary Design; sub-workpackages WP304, WP305, WP306) is planned to start following the Requirements Review and is planned to be concluded within 5 months, upon Preliminary Design Review.

WP400 (Detailed design; sub-workpackages WP401, WP402, WP403, WP403.1) is planned to start following the Preliminary Design review and detailed design of the full system is planned to be concluded within 5 months. HW and SW design is planned as a co-engineering activity for 4-weeks.
Preparatory activities of WP500 (Prototype Development & Test; sub-workpackages WP501, WP501.1, WP502, WP503) are planned to start after PDR, to ensure component selection and procurement does not delay prototype development. The core activities of WP500 are planned to start at T0+11, ending with CDR at T0+18.

Public holidays are taken into account in the proposed schedule.

Project management actions (WP100) will span over the full duration of the activity. The schedule takes further into consideration delays arising from schedule coordination for the technical reviews (availability of key personnel and ESA representatives) and possible iterations arising from RR and PDR.

The major meetings foreseen are presented in Table 3.

2.4.3 Meeting and Travel Plan

Table 3. Meeting and Travel Plan

Meeting	Purpose	Companies attending	Date(s)	Location	Work Package or Milestone
KoM	Kick-Off Meeting	ESA, HiQ	T0	Teleconference	WP100
Progress meeting #1	Results and conclusions of market survey	HiQ	T0 + 4w	HiQ, Estonia	WP200
Progress meeting #2	Progress assessment of requirement specification and concept design	HiQ	T0 + 6w	HiQ, Estonia	WP200
RR	Requirements Review	ESA, HiQ	T0 + 2mo	HiQ, Estonia	MS1
Progress meeting #3	Review of trade-off analysis, consolidation for breaboard development and test plan	HiQ	T0 + 4mo	HiQ, Estonia	WP300
Progress meeting #4	Breadboard development progress	HiQ	T0 + 5mo	HiQ, Estonia	WP300
PDR	Preliminary Design Review	ESA, HiQ	T0 + 7mo	HiQ, Estonia	MS2
Co-engineering meetings (8)	HW and SW consolidation for detailed design	HiQ, UPM	T0 + 7mo (4weeks)	HiQ, Estonia; telecoference	WP400
Progress meeting #5	Progress of design activities	HiQ, UPM	T0 + 9mo	UPM, Latvia	WP400
Internal review #1	Detailed design review and prototype development planning	HiQ, UPM	T0 + 13mo	HiQ, Estonia	WP500
Progress meeting #7	Prototype development and test progress	HiQ, UPM	T0 + 15mo	Teleconference	WP500

Critical performance testing	Test at ASTM F2990 Certified Commercial Coffee Brewers Testing Facility	HiQ, UPM	T0 + 16mo	Brewzone, Italy	WP500
Internal review #2	Prototype development and test results review	HiQ, UPM	T0 + 18mo	Teleconference	WP500
CDR	Critical Design Review	ESA, HiQ, UMP	T0 + 18mo	HiQ, Estonia	MS3
Final Review	Final Presentation of Project Outcome	ESA, HiQ	T0 + 18mo	ESTEC, ESA, Netherlands	Contract Closure

2.5 DELIVERABLE ITEMS

2.5.1 Documentation

Table 4. Deliverable items

Doc ID	Title	Milestone	Description of document
D1a	Requirements Specification	MS1	The Requirements Specification shall contain the full set of high level technical requirements to be met by the HBM. Each requirement shall be numbered and shall include the validation method and a justification/ reasoning for the requirement
D1b	Current and Future Market Assessment Report	MS1	Assessment of Current competitor. Assessment of competitor specifications and prices. Assessment of evolution of HBM machines.
D1c	Emerging Hot Beverage Requirement Report	MS1	Assessment of beverage types currently on offer, assessment of sales per type and evolution of these year by year from 2000 to 2017.
D2	Conceptual Design Document	MS1	The Conceptual Design Document shall outline the conceptual design of the HBM including all key features and a provisional layout, provisional MMIF and concept of operation. The key design drivers shall be highlighted and the key trade-offs identified and discussed.
D3	Breadboard Test Plan	MS1	The Breadboard Test Plan shall include the test flow and a description of each test. Each test description shall include the test set up, the purpose/ goal of the test and the pass/fail criteria. The Breadboard Test Plan shall contain all of the key tests needed to validate the concept and de-risk the further design work.
D4a	Preliminary Design Report	MS2	The Preliminary Design Report shall detail the design and design justification of the HBM and each of its sub-systems. In particular the Mechanical Design, the Electrical Design, the Software Design, the Man-Machine Interface and operational concept and the water and pressure system design
D4b	Preliminary Software Design	MS2	Specific test plan and test flow for the software with purpose and method for each test
D4c	Preliminary Pressure System Design	MS2	Specific test plan and test flow with test levels and pass fail criteria for the Pressure system. Reference to facilities will be made.

D5	Breadboard description	MS2	The Breadboard Description shall describe and justify the design of the Breadboard model, highlighting the differences between it and the expected final design and the limitations on its representivity.
D6a	Prototype Test Plan	MS2	The Prototype Test Plan shall include the test flow and a description of each test. Each test description shall include the test set up, the purpose/ goal of the test and the pass/fail criteria. The Prototype testing shall cover all of the requirements designated as to be validated by test.
D6b	Prototype Software Test Plan	MS2	Detailed software test plan as supplement to the complete D6a
D7	Breadboard Test Report	MS2	The Breadboard Test Report shall include a report, assessment and discussion on each of the test results with conclusions and recommendations. The report shall include as annexes the ‘as-run’ redlined test procedures.
D8	Detailed Design Report	MS3	The Detailed Design Report shall detail the design and design justification of the HBM and each of its sub-systems, expanding on the detail and depth provided in the Preliminary Design Report. In particular the Mechanical Design, the Electrical Design, the Software Design, the Man-Machine Interface and operational concept and the water and pressure system design shall be covered as well as a recurring cost assessment. Analyses on the safety and reliability aspects shall be included as well as any other analyses needed to demonstrate the agreed requirements.
D9	Prototype Test Report(s)	MS3	A summary report will be delivered and will include individual test reports for the different elements (s/w, pressure system) and tests (functional, electrical) as annexes
D10	Verification Control Document	MS3	The VCD shall, for each requirement, provide the reference to the validation evidence (e.g. which section of which document) and the latest predicted/ measured actual value achieved pertaining to the requirement.
D11	Proposed Design Changes Document	MS3	The document shall detail each of the proposed changes to be made between the prototype and the final production model. This shall take full account of the lessons learnt from the prototype manufacture and test. Each change shall be described in detail and justified.
TDP	Technical Data Package	Final Review	As defined in section 1.5 of Appendix 1 to the Draft Contract
ESR	Executive Summary Report	Final Review	see above
FR	Final Report	Final Review	see above
CCD	Contract Closure Documentation	Contract Closure	see above

2.5.2 Other Deliverables (Hardware, Software, Models, Data, etc.)

Table 5. Other deliverable items

Item Identifier	Title	Milestone	Qty	Format / Description
SW1	HBM Software	CDR	1	Only object code will be delivered.
HW1	HBM Breadboard	PDR	1	N/A.
HW2	HBM Prototype	CDR	1	Consumables (coffee, tea etc) will not be delivered with the unit.

PART 3 FINANCIAL PART

3.1 PRICE QUOTATION FOR THE CONTEMPLATED CONTRACT:

The total price for the activities detailed in this proposal is a Firm Fixed Price of 191,381.57 €
The above given Firm Fixed price is based on 2018 Economic Conditions.

3.2 DETAILED PRICE BREAKDOWN

3.2.1 PSS costing forms:
See Annex 1 for all PSS forms.

3.2.2 Milestone Payment Plan
See table 6 and 7.

Table 6: Milestone Payment Plan

Milestone (MS) Description	Schedule Date	Payments from ESA to (Prime) Contractor (in Euro)	Country (ISO code)
Progress (MS 1): Upon successful completion of the RR and successful review and acceptance of deliverables D1a, D1b, D1c, D2 and D3.	To + 2 months	75,000	EE
Progress (MS 2): Upon successful completion of the PDR and successful review and acceptance of deliverables D4a-c, D5, D6a-b, D7.	To + 7 months	74,570	
Final Settlement (MS 3): Upon successful completion of the CDR and the Agency's acceptance of all deliverable items due under the Contract and the Contractor's fulfilment of all other contractual obligations including submission of the Contract Closure Documentation.	To +18 months	41,812	
TOTAL		191,382	

Table 7: Advance payment

Prime (P)	**Company Name**	**ESA Entity Code** (at contract signature)	**Country (ISO code)**	**Advance Payment (in Euro)**	**Offset against**	**Offset by Euro**	**Condition for release of the Advance Payment**
P	HiQ Beverages Ltd		EE	66,984	MS 1	66,984	Upon signature of the Contract by both Parties

Table 8: Payment breakdown

For Information purposes only : Amounts in Euro for Contractor and Sub-contractor(s)				
Milestone	**Prime Contractor** HiQ Beverages Ltd	***Insert Country (ISO code)*** **EE**	**Sub-contractor A** Under Pressure Manufacturing Ltd	***Insert Country (ISO code)*** **LV**
Advance	61,984		5,000	
MS-1	8,016		0	
MS-2	55,600		18,970	
Final 1	41,812		0	
TOTAL	167,412		23,970	

3.3 COST TO COMPLETION

A cost to completion is not required for Education, Awareness or Preparatory Activities. A cost to completion would be positive for all other activities with a completion TRL of 6 or less, and is omitted in this example proposal. This information is provided for information only and is not binding in any way for either party (ESA or Tenderer).

PART 4 CONTRACT CONDITIONS PART :

4.1 INTELLECTUAL PROPERTY RIGHTS

4.1.1. Background Intellectual Property and Third Party Intellectual Property Rights

Table 9: Background IPR

Exact name of BIPR Item	Owner, Country	Description	Reference: Patent / Issue / Revision / Version/ /Licence #	Contract / Funding Details under which the IPR was created	Name of the affected deliverable
Software controlled super-automation	HiQ Beverages Ltd, EE	Intelligent multi-functional and configurable precision control of hot beverage machines	Patent #1234	Self-funded	D4b -Software Preliminary Design. This document will be marked company confidential and distribution is limited to the ESA TO.

4.1.2 Foreground Intellectual Property

The expected Intellectual Property that will be created under this project:
- Nanofoaming technology

4.1.3 Ownership of Foreground Intellectual Property

All Foreground Intellectual Property Rights created as a result of the present activity will belong to the HiQ Beverages Ltd. The subcontractor will not have rights to any Intellectual Property created as a result of the development.

ESA shall have an irrevocable right to use the information used in this application, for its own requirements on the terms set out in Article 6.2.2 of the draft Contract.

4.2 IMPORT AND EXPORT LICENCES

4.2.1 Import and Export Licences applicable to this Activity

The Tenderer declares that no items subject to import or export control will be used in the execution of this activity.

4.2.2 Import and Export Licences applicable to a product or services arising from or resulting from this Activity

The Tenderer declares that any products or services arising from or resulting from this activity will not be subject to import or export control or make use of any import/ export controlled items.

ATTACHMENTS:

ANNEX 1: Signed PSS-A1 form
Signed PSS-A2 form
Signed PSS-A2 Exhibit A form
Signed PSS-A2 Exhibit B form
Signed PSS-A8 form

ANNEX 2: DESCRIPTION OF TENDERER'S FACILITIES FOR THE EXECUTION OF THE WORK
ANNEX 3: DETAILED CVs
ANNEX 4: LETTERS OF INTENT

Inclusion of annexes containing full CVs or description of company facilities are optional. Please note, the evaluation board is not obliged to read the annexes.
*Key elements of the proposal – WPD, GANTT, etc., **should not** be listed as annexes.*
For the example proposal the facilities description and CVs have been included only in summary form in the proposal template.

ANNEX 1:

*For the example proposal only the PSSA1, A2 and A8 forms for the Prime have been included and they have not been signed. In your proposal include **all** PSS forms (inc. those of the sub-contractor) and make sure all are **signed.***

PSS-A2 form

COMPANY PRICE BREAKDOWN FORM		Form No. *PSS A2*		Page no. 1 of 1	Issue 5
RFQ/ITT No.:	18.187.04			COMPANY	
Proposal/Tender No.:	1			Name:	HiQ Beverages Ltd
Type of Price:	FFP	Firm Fixed Price		Country:	Estonia
Economic Condition:	2018				
National Currency (NC):	EUR			Representative	
Exchange Rate (X):	1 EURO =	1.00000	EUR	Name and Title:	Mr. Bean
Contractual Phase:	N/A			Signature:	
Project/Work Package(s):					

							TOTAL (NC) EUR	TOTAL (EURO) NC / X
	LABOUR							
Direct Labour cost centres or categories Code / Description		*No. of FTE (calculated) U = W / V*	*Sold Hours per ManYear V*	*Manpower Effort No. of Hours W*	*Gross Hourly Rate in NC*			
	Project Manager	0.2	1,600	300	39.24		11,772.00	11,772.00
	Senior Engineer	0.9	1,800	1,550	57.84		89,652.00	89,652.00
	Junior Engineer	0.3	1,800	550	36.72		20,196.00	20,196.00
	Technician	0.2	1,800	400	28.44		11,376.00	11,376.00
	QA Manager	0.0	1,800	80	48.72		3,897.60	3,897.60
							0.00	0.00
							0.00	0.00
							0.00	0.00
							0.00	0.00
							0.00	0.00
							0.00	0.00
1	Total Direct Labour Hours and Cost	*1.6*		*2880.0*		A	*136,893.60*	*136,893.60*
	INTERNAL SPECIAL FACILITIES							
Code	*Description*		*Type of unit*	*No. of units*	*Unit rates in NC*			
	Pressure testing Chamber		Day	1	1,000		1,000.00	1,000.00
							0.00	0.00
							0.00	0.00
							0.00	0.00
							0.00	0.00
2	*Total Internal Special Facilities Cost*					B	*1,000.00*	*1,000.00*
	OTHER DIRECT COST ELEMENTS	*Base amounts in NC*	*+ OH %*	*OH amounts in NC*				
3.1	Raw materials	1,455	5.0%	73			1,527.75	1,527.75
3.2	Mechanical parts	1,973	5.0%	99			2,071.65	2,071.65
3.3	Semi-finished products						0.00	0.00
3.4	Electrical & electronic components	733	10.0%	73			806.30	806.30
3.5	HIREL parts							
	a) procured by company						0.00	0.00
	b) procured by third party						0.00	0.00
3.6	External Major Products						0.00	0.00
3.7	External Services	3,000	15.0%	450			3,450.00	3,450.00
3.8	Transport and Insurances						0.00	0.00
3.9	Travel and Subsistence	3,180	10.0%	318			3,498.00	3,498.00
3.10	Miscellaneous	600	5.0%	30			630.00	630.00
3	*Total Other Direct Cost*	*10,941.00*		*1,042.70*		C	*11,983.70*	*11,983.70*
4	**SUB-TOTAL DIRECT COST**				**(A+B+C)**	**D**	**149,877.30**	**149,877.30**
	GENERAL EXPENSES	*Cost items to which % applies*		*Base Amount in NC*	*OH %*			
5	General & Administration Expenses	1		*136,893.60*	3.75%	E	5,133.51	5,133.51
6	Research & Development Expenses					F	0.00	0.00
7	Other					G	0.00	0.00
8	**TOTAL COMPANY COST**				**D+(E+F+G)**	**H**	**155,010.81**	**155,010.81**
		Cost items to which % applies		*Base Amount in NC*	*%*			
9	PROFIT	1		155,010.8	8.0%	I	**12,400.86**	**12,400.86**
10	COST WITHOUT ADDITIONAL CHARGE					J		0.00
11	FINANCIAL PROVISION FOR ESCALATION					K		0.00
12	**TOTAL COMPANY PRICE**				**(H+I+J+K)**	**L**	**167,411.67**	**167,411.67**
13	TOTAL SUB-CONTRACTOR PRICE					**M**		23,969.90
14	REDUCTION for COMPANY CONTRIBUTION					**N**		0.00
15	**TOTAL PRICE FOR ESA**				**(L+M-N)**		**167,411.67**	**191,381.57**

COMPANY PRICE BREAKDOWN FORM **EXHIBIT "A" TO PSS A2** Issue 5

Page No. 1 No. of Pages 1

RFQ/ITT No.:	18.187.04	COMPANY NAME:	**HiQ Beverages Ltd**
Proposal/Tender No.:	1	Name and Title:	**Mr. Bean**
National Currency:	EUR		
Contractual Phase	N/A	Signature	

Applicable to PSS-A2 elements: 3.1-3.4 - 3.6 - 3.7 - 3.10 - 10
Project / Work Pa(CM2000 Development; WP300, WP400, WP500

Cost El. No.	ITEM DESCRIPTION	Type of Price	Purchase Currency	Purchase Amount	Exchange rate 1 NC =	Amount in NC
3.1	Raw Materials: Copper, Stainless Steel for component manufacturing	FFP	EUR	1,455.00	1.00000	1,455.00
3.2	Mechanical Parts: Soldering support equipment, mechanical seals, slides, hinges, toggle clamps	FFP	EUR	1,973.00	1.00000	1,973.00
3.4	Electrical & electronic components: resistors, capacitors, LEDs, transistors, etc	FFP	EUR	733.00	1.00000	733.00
3.7	External Test Facility: ASTM f2990 Certified Commercial Coffee Brewers Testing Facility at Brewzone, Italy	FFP	EUR	3,000.00	1.00000	3,000.00
3.9	Travel and Subsistence: Meeting with Subco, testing travel to Italy (see Exb. B)	FFP	FFP	3,180.00	1.00000	3,180.00
3.10	Miscellaneous: raw food material for testing (coffee, cocoa beans, tea, syrups, milk)	FFP	FFP	600.00	1.00000	600.00

TRAVEL PLAN AND COST DETAIL — **EXHIBIT "B" TO PSS-A2** — Issue 1

RFQ/ITT No.:	18.187.04	Project:	**CM2000 Development**	
Proposal/Tender No.:	1	Company:	**HiQ Beverages Ltd**	
Contractual Phase	N/A			
Economic Condition:	2018	Type of Price:	FFP	
National Currency (NC)*:	**EUR**	Exchange (**X**): 1 EURO =	1 EUR	

WP Reference Number	WP Title	Purpose/Event	Departure	Destination	Nr. of Trips	Avg.People per Trip	Travel Cost p.p. (NC)	B / E	Avg.Days per Trip	Subsistence Cost p.d. (NC)	A / R	Total Cost (NC)	Total Cost (EURO)
WP400	Detailed Design	Progress meeting #5	Tallinn, Estonia	Riga, Latvia	1	2	100	E	2	120	R	680	680
WP500	Prototype Development and Test	Critical Performance test at ASTM F2990 Certified Commercial Coffee Brewers Testing Facility	Tallinn, Estonia	Brewzone, Italy	1	2	300	E	2	150	R	1,200	1,200
WP500	Prototype Development and Test	Final Presentation of Project Outcome	Tallinn, Estonia	Noordwijk, Netherlands	1	2	250	E	2	200		1,300	1,300
Total Cost, WBS level 1 (equal to the item 3.9 of PSS-A2)												**3,180**	**3,180**

PSS-A1 form

COMPANY RATES AND OVERHEADS	FORM No. **PSS A1**		Page no. 1 of 1	Issue 5
			COMPANY NAME: HiQ Beverages Ltd; Estonia	
RFQ/ITT no.:	18.187.04			
PROPOSAL no.:	1		Name and title: Mr. Bean	
ECONOMIC CONDITIONS:	2018			
NATIONAL CURRENCY (NC):	EUR		Signature:	
VALIDITY 6 months	From. 01.09.18	To.01.06.2018		
ESA Audit agreement reference / date	N/A			

Agreed by

Status (x when applicable)

1. LABOUR

Direct labour cost centres or categories Code and Name		*Basic Hourly Rate (NC)*	*Direct Overhead (% or Rate in NC)*	*Gross Hourly Rate (NC)*
	Project Manager	32.70	20	39.24
	Senior Engineer	48.20	20	57.84
	Junior Engineer	30.60	20	36.72
	Technician	23.70	15	27.26
	QA Manager	40.60	20	48.72

2. INTERNAL SPECIAL FACILITIES

Facility Code and Name		*Type of Unit*	*UNIT RATE (NC)*
	Pressure testing chamber	Day	1000

3. OTHER COST ELEMENTS

Standard ESA type		*According to normal company type*	*OVERHEAD %*
3.1	Raw materials		5
3.2	Mechanical parts		5
3.3	Semi-finished products		10
3.4	Electric & electronic components		10
3.5	Hirel parts		10
	a) procured by company		5
	b) procured by 3rd party		10
3.6	External major products		10
3.7	External services		15
3.8	Transport, insurance		10
3.9	Travels		10
3.10	Miscellaneous		10

GENERAL EXPENSES

According to ESA type	*According to normal company type*	*Applicable on cost element no.*	*OVERHEAD %*
5. General & Administration expenses		1	8.0
6. Research & Development expenses			0
7. Other (specify)			

PSS-A8 form

COMPANY MANPOWER AND PRICE SUMMARY PER WP Form no. **PSS A8** Page X of Y Issue 5

ITT/RFQ:	18.187.04	Price Type:	FFP
Proposal/Tender No.:	1	Economic Conditions:	2018
Company Name:	HiQ Beverages Ltd	National Currency (NC):	EUR
Contractual Phase:	N/A	Exchange Rate: 1 EUR =	01-1900
WBS-Level (Number and Title):	1 Workpackage		

WP Title		Management	Requirement Specification and concept	Preliminary Design	Detailed Design	Prototype Development & Test								Total WBS-Level
WP Number		100	200	300	400	500								
Labour Hours per category	Hours													
Project Manager	#	300												300
Senior engineer	#		190	140	680	540								1,550
Junior Engineer	#		50	100	100	300								550
Technician	#			120	40	240								400
QA Manager	#			10	10	60								80
...	#													
...	#													
...	#													
Total Labour Hours	#	300	240	370	830	1,140								2,880
1. Total Labour Cost	NC	11,772.00	12,825.60	15,669.60	44,628.00	51,998.40								136,893.60
2. Internal Special Facilities Cost	NC					1,000.00								
3.1-3.4 Material Costs	NC			1,933.00		2,472.70								4,405.70
3.5 High Rel Parts Costs	NC													
3.6 External Major Products Cost	NC													
3.7 External Services Cost	NC					3,450.00								3,000.00
3.8 Transport/Insurance Cost	NC													
3.9 Travel and Subsistence Cost	NC				780.00	2,718.00								3,498.00
3.10 Miscellaneous Cost	NC					630.00								630.00
3. Total Other Costs (sum of above 3.x)	NC	0.00	0.00	1,933.00	780.00	9,270.70								11,983.70
4. Sub-Total Direct Cost	NC	11,772.00	12,825.60	17,602.60	45,408.00	62,269.10								149,877.30
5.- 7. General expenses	NC	441.45	480.96	587.61	1,673.55	1,949.94								5,133.51
8. Sub-Total Company Cost	NC	12,213.45	13,306.56	18,190.21	47,081.55	64,219.04								155,010.81
9. Profit Fee	NC	977.08	1,064.52	1,455.22	3,766.52	5,137.52								12,400.86
10. Cost without additional charge	NC													
11. Financial Provision for escalation	NC													
12. Total Company Price	NC	13,190.53	14,371.08	19,645.43	50,848.07	69,356.56								167,411.67
	EURO													
13. Total Sub-Contractors Price	NC				12,943.80	11,026.10								23,969.90
	EURO													
14. Reduction for Company contribution	NC													
15. Total Price for ESA	NC													
	EURO	13,190.53	14,371.08	19,645.43	63,791.87	80,382.66								191,381.57