Detailed Budgetary Quotation

Automated spraying and sanding with integrated coating thickness measurement

Prepared by	Prepared for
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In-house POC with vertical turntable, transportable fixture pallets and protected metrology

This revision develops the September SOW into a bounded AETEC in-house trial programme. It incorporates the 20 September design direction: ABB PoWa 20 as Option 1, ABB IRB 5500-22 as the spray alternative, vertical C axis, bottom support, covered tool changes and modular connected construction.

Commercial summary	SGD excluding GST
Defined AETEC POC scope	386,000
Controlled third-party provisional sums	55,000
POC funding envelope	441,000
Change from R0 funding envelope	+58,000

Planning estimate for scope review; supplier prices and temporary-equipment bookings are not secured. R2 adopts the user-specified ATEX-certified robot protection package. Reconcile its exact temporary/supply cost before firm commercial issue; this revision does not invent a confirmed supplier price. The final production cell and new permanent robots / metrology equipment are not included. The numerical funding envelope is unchanged from R1. A formal Q number will be allocated before issue for order.

Design element	Proposed basis / verification
Physical trials	One 1.4 m cylinder and up to two open-cover samples; one coating system. DSO supplies parts, coupons and process materials.
Trial location	AETEC in-house. Use of an existing suitable facility, extraction and equipment is a readiness condition; no new booth or certified plant is priced.
Schedule / validity	Target 12 weeks after PO, initial payment and readiness release. Valid 30 days from 20 September 2026. This conditional start qualifies the draft SOW timing.
Scope separation	2.1 m final equipment design study included. Production manufacture, production SAT and actual abrasive blasting trials are separate.

Detailed scope and pricing

#	Item and detailed description	Qty	Unit	Unit price SGD	Line total SGD
01	Requirements and verification plan SOW mapping, two part families, acceptance and witness matrix, coating / coupon plan, design release inputs.	1	lot	12,000	12,000
02	Fixture and vertical handling engineering Bottom-supported inverted-cup fixture; no top support. Pallet datum / clamp design, internal pad contact, axial retention, handling and deflection study.	1	lot	24,000	24,000
03	Cylinder removable pallet fixture One stiff aluminium pallet and internal-support prototype; fork pockets, handles, lifting interfaces, three datums, lower retaining interface and replaceable contact pads.	1	set	22,000	22,000
04	Open-cover support cassette One interchangeable open-cover support cassette with local backing, approved internal contact zones and common pallet connection.	1	set	16,000	16,000
05	Vertical C-axis and docking adaptation Temporary vertical-axis positioner adaptation, guarded drive interface, pallet docking and positive locking, brake / presence / bonding checks. No new permanent production table.	1	lot	25,000	25,000
06	Temporary robot and common trial frame Temporary access to one suitable PoWa 20 platform, raised pedestal and bolted common trial frame with support feet, protected services and relocation interfaces. Provider retains temporary equipment.	1	lot	31,000	31,000
07	Scanning integration and optical protection MetraSCAN BLACK+ Elite and C-Track+ Elite integration basis; coordinate / scan workflow, prototype scanner storage cover and fixed-tracker shutter, dry purge interfaces and repeatability checks. Metrology access is PS1.	1	lot	30,000	30,000

Detailed scope and pricing continued

#	Item and detailed description	Qty	Unit	Unit price SGD	Line total SGD
08	Thickness metrology development Pre/post surface correlation and direct-reference method, bias / repeatability / refixture study and two-zone maps. Reference equipment access is PS2 / PS3.	1	lot	28,000	28,000
09	Spray and material-delivery POC One spray head and batch material-delivery interface; agitation study, shutoff / flush containment, capped process couplings, covered inactive tool location and deposition trials.	1	lot	33,000	33,000
10	Force-controlled sanding and capture One temporary compliant sanding interface, force measurement, abrasive study, local vacuum connection and bounded removal trials. Existing suitable collector is required.	1	lot	29,000	29,000
11	Adaptive process and protection software One platform: scan-to-path, thickness masks, correction logic, tool ID / lock checks, protected-dock sequence, extraction / cover interlocks, clean-release state and process records.	1	lot	49,000	49,000
12	Representative part trial campaign One planned campaign; two part families; three full-part executions; up to three correction iterations per family and one implementation-related corrective campaign.	1	lot	28,000	28,000
13	POC and final modular-cell design AETEC in-house POC arrangement and DSO 2.1 m final-cell concept; booth / services, modular frame, robot lift study, two robot options, reach and engineering release register.	1	lot	18,000	18,000
14	Evidence and handover package Process / fixture reports, maps, setup and cycle breakdowns, design-review sheets, processed parts, two half-day training sessions, interactive web app and narrated video.	1	lot	21,000	21,000
15	Project management and in-house readiness Design / readiness reviews, equipment scheduling, in-house setup and demobilisation, two witnessed reviews, trial planning and interface coordination.	1	lot	20,000	20,000

Defined AETEC POC scope: SGD 386,000 excluding GST

R0-to-R2 change and equipment options

Affected items	R2 scope development	Increase SGD
02-05	Vertical fixture engineering, transportable pallet, cover cassette and positive table docking	20,000
06	Connected common frame / raised robot / protected service integration	10,000
09-10	Protected process interfaces and dust capture development	7,000
11	Tool change, covers, clean release and fault sequencing	7,000
13-15	Two cell designs, expanded evidence and in-house readiness	14,000
Total change	R0 fixed 328,000 to R2 fixed 386,000	58,000

These are scope-based planning adjustments, not vendor quotations. Optical prototype protection is allocated within Item 07 together with tool / control work in Items 09-11; it is not charged as a second scanner purchase.

Option	POC / final-cell treatment
1 - ABB PoWa 20	20 kg platform for scan and controlled sanding study; temporary access only in the base POC. Use the user-specified ATEX-certified protection package for spraying. Exact robot/cover codes, certificate scope, supply/purge requirements and package-ready feedback form the supplier release dossier; supplier package cost / temporary availability must be reconciled before firm issue.
2 - ABB IRB 5500-22	13 kg wrist, purpose-built paint robot. Selection / comparison is included; hire, purchase, transport, certified setup and IRC5P integration are unpriced variations. Separate qualified sanding platform required.
Permanent final equipment	Final robot, lift, turntable, scanner/C-Track, tool packages, plant and production controls: separate quotation after POC and design freeze. The earlier PoWa robot allowance from Junxiang is not a current supplier offer.

Provisional sums and bounded trials

Ref.	Third-party scope	Qty	Amount SGD
PS1	Temporary scanner / C-Track / software access and application support	1 lot	35,000
PS2	Qualified direct-reference equipment trial / application support	1 lot	15,000
PS3	Approved independent reference measurements	1 lot	5,000
Total	Controlled spending cap		55,000

Approve the supplier scope and amount in writing before commitment. Unused amounts are not invoiced. Confirmed loan / free-issued equipment reduces the corresponding allowance. Earlier discussions of a scanner loan do not establish current availability, mounting permission or SDK licensing.

Design element	Proposed basis / verification
Coupons	15 metrology coupons (five levels x three) plus 12 process / sacrificial coupons. DSO supplies specimens and agreed independent known values.
Full-part executions	Three total: cylinder, cover and one reserved repeat / verification. Replacement parts are required if further processing would damage the sample.
Correction / reference	Up to three correction iterations per family; three refixture checks; ten repeat readings at low / middle / high conditions; at least 60 reference locations across both families including chamfers.
Qualification boundary	One implementation-related corrective campaign included. Independent blind validation of both families needs additional holdout parts. No production-capability claim from this sample count.
Deliverables	Defined reports, data / maps, processed parts, paid custom fixtures, configuration records, design sheets, web app and video; two witnessed reviews and two half-day training sessions.

Payment, ownership and responsibilities

Milestone	Share	Amount SGD
PO and kickoff	30%	115,800
Design / test protocol approval	30%	115,800
Platform and trial readiness	20%	77,200
Agreed tests and report delivered	20%	77,200
Fixed total	100%	386,000

Invoices payable within 14 days. Approved provisional sums are funded before commitment and reconciled against approved expenditure. GST is additional at the applicable rate.

AETEC scope and ownership

AETEC designs and integrates the bounded trial setup, executes the agreed programme and provides the defined evidence. DSO receives paid custom prototype fixtures, its parts, project-specific data/reports and an internal-use licence to the compiled POC application. AETEC retains background IP, generic algorithms and interfaces; source-code transfer / unrestricted replication is separate. Temporary equipment stays with its provider.

DSO inputs

Provide neutral CAD/drawings, actual diameter/section and mass/centre of gravity, approved internal contact and retention features, laminate/core details, current coating/solvent SDS/TDS, target criteria, parts/coupons and consolidated decisions. Agree transport, witness attendance, destructive-reference locations and coating material supply.

Readiness and acceptance

The programme assumes equipment by Week 3 and samples, materials and facility release by Week 4; feedback within five working days. Physical spraying is held until the exact installation is suitable. New certified equipment or facility works require programme revision.

Acceptance requires the signed verification matrix, agreed tests, data, demonstration and report. Technical Go / Conditional Go / No-Go is stated separately from commercial completion. One reasonable correction and retest for AETEC implementation deficiency is included. 90-day prototype hardware/software workmanship warranty; wear, consumables, material outcomes and third-party equipment terms are excluded.

Exclusions and order basis

- Permanent production robots, lift axis, new production turntable, purchased scanner/tracker, production SAT, endurance testing and guaranteed takt / coating capability.
- Supply or major upgrading of spray booth, fan / duct / filter plant, dust collector, fire systems, hazardous-area conversion, whole-cell certification, building/floor works or utilities beyond agreed existing interfaces.
- Automatic plural-component plant, inert-gas plant, pressure equipment and waste services beyond the defined batch interfaces.
- Sandblasting media trials, blast pot/nozzle/booth, recovery system and abrasive process qualification. A reserved modular interface is included in the design study only.
- Pallet jack / pallet stacker / crane supply. Handling equipment is existing or free-issued, and must meet approved load and fork requirements.
- Coating materials, cleaners, expendable customer specimens, extra variants and unlimited trials; structural qualification, machining/chamfer cutting, layup, honeycomb manufacture, NDT and production certification.
- Exact native-part CAD clearance sign-off before geometry conversion; full certified motion programming for both robot brands; enterprise integration and unrestricted IP transfer.

Relationship to earlier work

This revision supersedes the R0 budget for the defined POC only. It does not combine the separate Junxiang dual-rack spray system Q912226008A, Nomex equipment or the broader adaptive-manufacturing programme. Reconcile previously paid fixture/metrology work and confirmed equipment loans before formal issue to avoid duplicate charging.

Release decisions

Freeze: exact robot/process environment; part contact/retention and handling data; POC facility and equipment availability; reference method and coating criteria; final-cell option / footprint; agreed trial and commercial matrix.

For Aetec Pte. Ltd. **Customer acknowledgement**

Name / signature: _____ Name / signature: _____

Date: _____ Date: _____