AJJ Research

AJJ × Huaxi HIT-1 Humanoid Eldercare Robot Platform

Institutional, Commercial, Technical, Compliance and Governance Q&A

For Government Agencies, Eldercare Institutions, Data Engineers, Healthcare Compliance Officers and Procurement Committees

Important Notice / Public Communication Statement for a Listed Company

This Q&A has been prepared by AJJ Research as a public-facing explanatory and governance-support document for institutional, commercial, technical, compliance and procurement communication relating to the AJJ × Huaxi HIT-1 humanoid eldercare robot platform. It is intended to help investors, institutional customers and other stakeholders understand the product positioning, functional boundaries, deployment logic and compliance controls.

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1. What is the HIT-1 Platform?

Q1. Is HIT-1 a robot, or an eldercare platform?

Commercial Language

HIT-1 should not be understood merely as "a robot". It is more accurately positioned as an **AI-assisted eldercare operations platform with a humanoid robotic front-end**.

For an eldercare institution, the value is not limited to a mobile device that can speak, patrol or interact. The real value lies in a platform that may help the institution support night-shift patrols, reduce repetitive caregiving workload, improve abnormal-event visibility, strengthen care documentation, optimise manpower allocation, improve family confidence and support a more technology-enabled eldercare service model.

In commercial terms, HIT-1 is not only a hardware purchase. It is an operating tool for improving eldercare productivity, service consistency and long-term institutional competitiveness.

Technical and Compliance Language

Technically, HIT-1 is part of an integrated AI-enabled care operations platform. It includes a humanoid robotic front-end, AI-assisted patrol and alert functions, health and safety monitoring support, care workflow support, remote communication, data logging, system management and compliance-oriented controls.

The platform architecture may include front-end robotic applications, a middle-layer AI / data / IoT / security / decision-support layer, and back-end infrastructure and compliance-governance layers. Matters relating to medical-device regulatory pathways, ISO standards alignment, PDPA data governance, system integration and cybersecurity controls will be progressively implemented and reviewed as necessary, based on the specific deployment scenario, product intended use, data type and applicable regulatory requirements.

Q2. What is the core purpose of HIT-1?

Commercial Language

The core purpose of HIT-1 is not to replace caregivers. Its purpose is to help eldercare institutions reduce operational pressure, improve service quality, support caregiver productivity and build a more sustainable smart eldercare model.

It addresses major institutional pain points such as caregiving manpower shortage, heavy night-shift workload, repetitive care routines, delayed abnormal-event detection, inconsistent care documentation and increasing family expectations for transparent and technology-enabled care.

Technical and Compliance Language

The technical purpose of HIT-1 is to support **AI-assisted monitoring, workflow coordination, alert escalation and care-operation data logging**.

It should be treated as a **human-supervised care support system**, not an autonomous medical or caregiving decision-maker.

2. Commercial Value and Institutional Benefits

Q3. What is the most direct commercial value of HIT-1 for a nursing home?

Commercial Language

For eldercare institutions, the most direct commercial value of HIT-1 is not merely the provision of a robot. Its value lies in helping institutions gradually upgrade traditional care operations — which rely heavily on manual patrols, manual reminders, manual records and manual communication — into an **AI-assisted, continuously observable, alert-enabled, reviewable, recordable and human-robot collaborative eldercare operating model**.

Eldercare institutions commonly face several operational pain points, including caregiver shortages, night-shift manpower constraints, delayed detection of changes in residents' conditions, higher risks of falls and bed-exit events, difficulty in continuously observing sleep quality, fragmented chronic-condition data, increasing family communication expectations, and rising requirements for care documentation and accountability. HIT-1 is designed to address these practical institutional pain points.

The direct commercial value of HIT-1 can be understood in the following areas:

1) **Strengthening vital-sign and physiological health monitoring support**
   HIT-1 can support physiological health monitoring, continuous patient monitoring, health-status visualisation and abnormal-status alerts. Depending on the specific deployment configuration, such health-monitoring support may include the connection, recording, display, trend observation and caregiver-review reminders for physiological parameters such as blood pressure, blood glucose, body temperature, SpO_2, heart rate and ECG-related data.
   These capabilities may help institutions detect changes in residents' conditions earlier and provide assistive observation information to caregivers. They should not be understood as autonomous diagnosis, but as support for daily observation, trend review and necessary care escalation.
2) **Improving sleep-quality observation and night-time status management**
   HIT-1 can support sleep monitoring, sleep-quality observation, night-time activity records, bed-exit frequency observation and rest-pattern visualisation.
   For eldercare institutions, night-time waking, frequent bed-exit events, sleep interruptions, abnormal night-time activities or changes in rest patterns may be associated with fall risk, changes in care needs and night-shift care pressure. HIT-1 can help institutions better understand night-time care workload and changes in residents' night-time status.

3) **Enhancing bed-exit, fall-detection and night-time safety alerting**
   HIT-1 can support bed-exit detection and alerts, fall detection, night-time patrols, route patrols and abnormal-event reminders.
   These capabilities directly address institutional pain points such as night-shift manpower shortage, patrol blind spots, high-risk area management and delayed abnormal-event detection. The core value of HIT-1 is not to replace caregivers, but to help caregivers reduce blind spots, improve patrol continuity and strengthen abnormal-event detection capability.
4) **Reducing repetitive care-work pressure**
   HIT-1 can assist with routine patrols, reminders, broadcasting, basic service tasks, activity assistance and care-documentation support. This can help release part of caregivers' time from repetitive, low-value and physically demanding tasks, allowing them to focus more on emotional care, abnormal-event handling, resident communication and high-value human interaction.
5) **Supporting companionship, communication and cognitive engagement**
   HIT-1 can support daily conversation, companionship interaction, activity participation, family communication, emotional-status observation and cognitive-engagement support. For residents with loneliness, anxiety, mood changes, cognitive decline, memory deterioration or Alzheimer's disease / dementia-related care needs, HIT-1 may serve as an assistive communication and companionship tool among caregivers, residents and family members, helping improve interaction frequency, daily reminders, activity participation and continuity of care observation.
6) **Supporting care-workflow standardisation and event traceability**
   HIT-1 can support patrol records, alert records, care-task records, sleep-observation records, health-related data records, abnormal-event records and response-closure records. This allows institutions to review whether an abnormal event was detected, whether an alert was issued, who acknowledged it, when it was handled, how it was closed and whether it can be reviewed later.
7) **Improving service quality, family confidence and institutional differentiation**
   Through digital records, health-status visualisation, sleep observation, family communication support, companionship interaction, activity assistance and care-workflow management, HIT-1 may help improve service transparency, operational consistency and family confidence.
   For eldercare institutions, HIT-1 may also support differentiated positioning in high-end eldercare, smart eldercare, technology-enabled care and human-robot collaborative care.

Technical and Compliance Language

From a technical and compliance perspective, the core value of HIT-1 is not limited to the humanoid robotic front-end. Its value lies in the underlying capability to support **AI-assisted monitoring, continuous observation, vital-sign / physiological-parameter visualisation, sleep-quality observation, abnormal-event alerting, care-workflow recording, human acknowledgement, event closure, data governance and audit traceability**.

HIT-1 can support a closed-loop operating model for eldercare institutions, covering **device sensing, status capture, vital-sign / physiological-parameter recording, sleep and night-time activity observation, abnormal-event alerting, caregiver acknowledgement, response**

handling, record retention, management review and subsequent audit. Its technical and compliance value can be understood in the following areas:

1) **Continuous observation and vital-sign / physiological health monitoring support**
   HIT-1 can support physiological health monitoring, continuous patient monitoring, health-status visualisation and abnormal-status alerts. Depending on the specific deployment configuration, its health-monitoring support may include the connection, recording, display, trend observation and caregiver-review reminders for physiological parameters such as blood pressure, blood glucose, body temperature, SpO_2, heart rate and ECG-related data. These capabilities may help eldercare institutions move from traditional **intermittent manual patrols** toward an operating model based on **AI-assisted continuous observation, physiological-parameter visualisation and caregiver review**.
   The compliance boundary is that such outputs should be treated as care observation, health-status visualisation, trend prompts and review support. They should not be represented as autonomous diagnosis, clinical interpretation, treatment decision-making, automated risk stratification or replacement of medical devices / licensed healthcare professionals' judgement.

2) **Sleep-quality monitoring and night-time status observation**
   HIT-1 can support sleep monitoring, sleep-quality observation, night-time activity records, bed-exit frequency observation and rest-pattern visualisation.
   For eldercare institutions, sleep quality and night-time status changes are important night-shift management concerns. Night-time waking, frequent bed-exit events, sleep interruptions, abnormal activity or changes in rest patterns may be associated with fall risk, changing care needs, chronic-condition management and night-time care pressure.
   HIT-1's sleep-observation capability may help institutions better understand night-time care workload, bed-exit events, sleep interruptions and changes in residents' rest patterns, thereby supporting caregiver review, care response and necessary human escalation.
   The compliance boundary is that HIT-1 may support sleep observation and rest-pattern visualisation, but should not be promoted as a tool for sleep-disorder diagnosis, clinical sleep-disease assessment or automated medical intervention.
3) **Bed-exit detection, fall detection and night-time safety alerting**
   HIT-1 can support bed-exit detection and alerts, fall detection, night-time patrols and abnormal-event reminders.
   For eldercare institutions, these capabilities directly address operational pain points such as night-shift manpower shortage, patrol blind spots, night-time resident activity risks, high-risk area management and delayed abnormal-event detection.
   The compliance boundary is that HIT-1 may serve as a safety-alert and care-escalation support tool, but should not be promoted as a guarantee of fall prevention, automated clinical triage, automated safety intervention or replacement of caregiver judgement on site.
4) **Chronic-condition management support and caregiver review**
   HIT-1 can support data recording, trend observation, reminders and caregiver review relating to chronic-condition management. For example, under appropriate configuration and authorisation, the system may help create daily observation, trend visualisation and caregiver-review records around health-related data such as blood pressure, blood glucose, body temperature, SpO_2, heart rate and ECG-related data.

However, chronic-condition management support should not be understood as AI treatment management. HIT-1 should not autonomously interpret disease status, adjust medication, determine treatment plans or replace the clinical judgement of doctors, nurses or other licensed professionals.

5) **Companionship, communication and cognitive-engagement support**
   HIT-1 can support companionship, communication, cognitive engagement and psychosocial-support functions, including daily conversation, reminders, activity participation, family connection, emotional-status observation and cognitive-interaction support.
   For residents with cognitive decline, memory deterioration, Alzheimer's disease / dementia-related care needs, loneliness, anxiety or mood changes, HIT-1 may serve as an assistive communication and companionship tool among caregivers, residents and family members. It may help improve interaction frequency, daily reminders, activity participation and continuity of care observation.
   The compliance boundary is that these functions should be understood as companionship, interaction, reminder, observation and care-support capabilities. They should not be promoted as psychotherapy, diagnosis of cognitive impairment, treatment of Alzheimer's disease, treatment of depression or anxiety, or replacement of professional judgement by doctors, mental-health professionals, nurses or caregivers.
6) **Care-workflow standardisation and event-closure capability**
   HIT-1's value is not only in detecting abnormal events. It is also in helping institutions establish a manageable care workflow, including alert generation, human acknowledgement, response handling, event closure and subsequent review.
   This enables institutions to review:

   - whether an abnormal event was detected;
   - whether an alert was issued;
   - who acknowledged it;
   - when it was handled;
   - how it was handled;
   - how it was closed;
   - whether it can be reviewed later.

These capabilities support care-operation traceability, clearer accountability, management visibility and service-quality review.

7) **Care records, logs and audit traceability**
   HIT-1 can support care-task records, patrol records, sleep-observation records, vital-sign / physiological-parameter records, alert records, abnormal-event records, response records and system-log retention.
   These records should not be interpreted as automated clinical proof or certification. They should be understood as assistive records for internal care-operation management, caregiver review, service-quality improvement, risk management and compliance review.
   For a listed company and institutional customers, this **recordable, reviewable and auditable** capability is one of the key differentiators of HIT-1 compared with ordinary demonstration-type robots.
8) **Human-supervised boundary for AI outputs**
   HIT-1 may generate abnormal-event alerts, risk prompts, caregiver-review reminders and

operational support information.
However, all AI-generated outputs should remain subject to the **Human-in-the-Loop / Human Review** principle, under which caregivers, supervisors or authorised personnel confirm, judge and act on such outputs.
HIT-1 should not be described as an autonomous clinical decision-making system, automated diagnostic system, automated treatment-recommendation system, automated triage system or replacement for licensed nursing / medical personnel.

9) **Data governance, privacy protection and system-integration boundaries**
HIT-1 may involve multiple categories of data, including resident status, vital-sign / physiological parameters, sleep observations, care records, family communication records, device operation data and service logs.
Accordingly, any system integration, data export, remote maintenance, family connection, AI analysis or institutional dashboard use should comply with PDPA, access control, authorisation management, log retention, data minimisation and appropriate confidentiality arrangements.
Public-facing documents should not disclose specific API endpoints, payload fields, security credentials, detailed system architecture or non-public technical parameters. Detailed interface specifications should be provided only in confidential technical appendices to authorised IT / data-engineering teams.
10) **Regulatory boundary and further-review mechanism**
HIT-1 has completed HSA Class A notification, but its functions should continue to be managed according to their specific intended use, data type, clinical impact and deployment scenario.
If future functions involve autonomous diagnosis, treatment decision-making, active clinical risk assessment, automated triage, regulated EMR integration, cross-border health-data processing, medical-device data linkage or higher-level AI medical use, further HSA, data-protection, cybersecurity and institutional compliance review should be conducted.

The commercial, technical and compliance value of HIT-1 does not lie in a single robotic movement or isolated feature demonstration. It lies in its ability to support a human-robot collaborative eldercare operating system based on **vital-sign / physiological-parameter visualisation, sleep-quality observation, continuous monitoring, bed-exit and fall-related alerts, companionship and communication, cognitive engagement, care response, record retention, audit traceability and compliance-boundary control**.

Q4. Why is the value of HIT-1 more than just selling a device?

Commercial Language

The value of HIT-1 is not limited to the purchase of a single robotic device. For eldercare institutions, the real value should be assessed by how much HIT-1 may improve the institution's long-term operating model, not merely by its unit purchase price.

The largest pressure for eldercare institutions is often not the one-time purchase of equipment, but the long-term cost and complexity of care operations, including labour cost, night-shift cost, overtime cost, recruitment difficulty, training cost, staff turnover, workflow inefficiency and hidden risk costs arising from delayed response or inconsistent documentation.

Therefore, HIT-1 should be evaluated as part of an AI-assisted eldercare operating infrastructure. Its value may come from supporting care workflow consistency, reducing repetitive workload, improving management visibility, strengthening documentation, enhancing risk traceability and supporting a more technology-enabled eldercare service model.

In commercial terms, HIT-1 is not merely a device purchase. It is a potential operating tool that may help eldercare institutions improve efficiency, strengthen service quality, support family confidence and build long-term smart eldercare competitiveness.

Technical and Compliance Language

HIT-1 should be assessed through **total cost of ownership, operational value release and ROI modelling**, rather than hardware purchase price alone.

Value Area	Evaluation Focus	Target Consideration
CapEx	Hardware, installation, deployment and configuration	Assess initial investment and deployment readiness
OpEx	Maintenance, software updates, remote support and system operation	Assess long-term operating sustainability
Labour release	Reduction of repetitive caregiver workload	Determine whether caregiver time can be reallocated to higher-value care
Overtime reduction	Potential reduction of inefficient or avoidable overtime	Evaluate whether night-shift and staffing pressure can be reduced
Documentation value	More structured logs, reports and review evidence	Strengthen management visibility and audit readiness
Risk-management value	Better traceability of abnormal events and responses	Improve accountability, incident review and response transparency
Service differentiation	Technology-enabled eldercare positioning	Support premium-care positioning, family confidence and institutional competitiveness

3. Price, Cost and Savings Logic

Q5. HIT-1 may look expensive on the surface. Why may it actually save money and reduce operational risk in real nursing-home operations?

Commercial Language

This is one of the most important questions for eldercare operators.

On the surface, HIT-1 may look like a relatively expensive piece of equipment. However, the correct question is not only:

“How much does one robot cost?”

The better question is:

"How much will the traditional labour-intensive operating model cost over the next three to five years, especially when manpower pressure, night-shift risk, documentation gaps and regulatory exposure are taken into account?"

The largest long-term cost for many eldercare institutions is not equipment. It is caregiver wages, night-shift staffing, overtime, recruitment difficulty, staff turnover, training cost, repetitive low-efficiency work and operational pressure caused by delayed detection or inconsistent workflows.

The real risk for nursing homes is not simply that costs are rising. The real risk is that care operations may become difficult to supervise, difficult to evidence and difficult to defend when incidents occur. If night-shift gaps, incomplete records, delayed responses, medication errors, infection-control weaknesses or repeated care lapses accumulate, the institution may face regulatory intervention, loss of family trust, financial damage, reputational harm and, in severe cases, suspension or revocation of its operating licence.

In this context, the real cost of traditional eldercare operations is not only salary and overtime. It may also include hidden costs arising from delayed response, weak care follow-through, incomplete documentation, inconsistent workflow discipline, higher family concerns and regulatory exposure.

If HIT-1 can help reduce repetitive patrols, relieve night-shift pressure, reduce avoidable overtime, improve abnormal-event alerts, strengthen documentation and support more consistent workflow visibility, then it should not be viewed merely as an expensive robot.

It should be viewed as a long-term operating tool that may help the institution reduce cost, improve efficiency, strengthen care-operation visibility and reduce operational pressure.

Technical and Compliance Language

Whether HIT-1 is cost-effective should be assessed through **ROI, payback-period, operating-cost and operational-risk analysis**.

The assessment should consider the following dimensions:

Assessment Dimension	Evaluation Metric	Decision Purpose
Repetitive workload reduction	Repetitive work hours reduced per shift	Assess whether HIT-1 can release caregiver time from routine tasks
Night-shift coverage improvement	Increase in patrol frequency, monitoring coverage and route completion	Assess whether night-shift care coverage can be strengthened
Overtime reduction	Reduction in avoidable or inefficient overtime hours	Assess whether staffing pressure and labour cost can be reduced
Abnormal-event response efficiency	Time from event detection to human confirmation or response	Assess whether response visibility and timeliness can be improved
Documentation efficiency	Completeness, structure and usability of care logs and reports	Assess whether management review and audit readiness can be strengthened
Care workflow visibility	Visibility of patrols, alerts, reminders, responses and task completion	Assess whether care operations become more transparent and manageable

Assessment Dimension	Evaluation Metric	Decision Purpose
Staff adoption	Training completion, active usage rate and caregiver feedback	Assess whether HIT-1 can be practically accepted by care teams
Resident acceptance	Interaction rate, refusal rate, complaints and resident feedback	Assess whether HIT-1 is suitable for the resident environment
Maintenance and system operating cost	Maintenance, software updates, remote support and system operation cost	Assess long-term operating sustainability
Three-year to five-year TCO	Total cost of ownership over a multi-year operating period	Assess whether the investment is financially reasonable beyond unit price
Audit-readiness and governance-support value	Access logs, incident logs, response records and management review evidence	Assess whether HIT-1 supports compliance, accountability and governance oversight

The economic value of HIT-1 is based on **workflow economics and operational-risk visibility**, not only hardware pricing.

Q6. How does HIT-1 help nursing homes reduce labour-related costs?

Commercial Language

HIT-1 is not designed simply to remove caregivers. Its value is to release caregiver capacity by supporting repetitive, routine and standardised tasks.

It may assist with routine patrols, scheduled reminders, basic announcements, simple delivery tasks, basic observation support, assisted documentation, family connection and resident engagement.

This allows limited caregiving manpower to be redirected toward higher-value care activities, such as high-risk resident support, emotional care, abnormal-event handling, family communication, resident-centred interaction and premium service delivery.

In commercial terms, HIT-1 should be understood as a **caregiver-capacity release tool**, not a caregiver-replacement tool.

Technical and Compliance Language

HIT-1 reduces labour pressure through **task redistribution**, not direct headcount replacement. The correct technical question is not whether one robot replaces one caregiver, but whether robot-supported routine tasks can release measurable caregiver time under human supervision and institutional workflow boundaries.

This is consistent with the core logic of RR-Care™: selected robot-supported routine task activities are translated into FTE-equivalent workload-release and care-capacity planning indicators, while clearly emphasising that released time should not be interpreted as automatic staff reduction or a fixed headcount-reduction target. The related public research materials are available on the Company's website: www.ajjmedtech.com.sg/publication

Task Type	HIT-1 Support Logic	Quantification Method	Decision Purpose
Repetitive patrols	Robot-assisted patrol support	Patrol rounds reduced per shift; patrol time saved; route-completion rate	Assess whether caregiver walking and routine checking burden can be reduced
Routine reminders	Automated or semi-automated reminder support	Number of reminders completed; caregiver reminder time reduced; missed-reminder rate	Assess whether routine reminder workload can be standardised and reduced
Basic announcements	Robot-assisted broadcasting	Number of announcements delivered; staff broadcasting time saved	Assess whether low-value communication tasks can be reduced
Simple delivery tasks	Robot-assisted delivery support	Delivery trips reduced; delivery minutes saved per shift	Assess whether errand-type workload can be released
Routine observation	AI-assisted monitoring and alert support	Observation rounds reduced; abnormal-event alerts logged; response time measured	Assess whether basic observation coverage and response visibility can improve
Documentation support	Assisted digital records and logs	Log-completion rate; time saved in routine documentation; timestamp completeness	Assess whether documentation efficiency and audit readiness can improve
Family connection	Assisted video call or communication support	Number of assisted calls; staff coordination time reduced; family feedback	Assess whether family communication workload can be supported
Resident engagement	AI-assisted companionship and interaction	Interaction sessions; resident acceptance; caregiver time redirected to deeper care	Assess whether basic engagement can support resident experience without replacing human care
Staff redeployment	Released caregiver time redirected to higher-value tasks	Minutes or hours reallocated to high-risk residents, emotional care, documentation or care planning	Assess whether released time creates real care-capacity value
FTE-equivalent workload release	Aggregated routine workload release converted into planning indicator	Daily saved hours ÷ local FTE daily working-hour benchmark	Assess whether workload release is meaningful for staffing-pressure review and care-capacity planning

This belongs to **care workload reallocation** and **FTE-equivalent workload release**, not simple labour substitution.

Any quantified result should be locally validated by actual workflow observation, operating logs, staff feedback, supervision burden and site-specific care demand.

Q7. How does HIT-1 help reduce night-shift pressure and overtime cost?

Commercial Language

Night shift is one of the most difficult, costly and high-risk operating periods in eldercare institutions. It is usually characterised by fewer caregivers, higher fall and bed-exit risk, caregiver fatigue, long patrol routes, delayed discovery risk and stronger family concern over night-time safety.

HIT-1 can support night-shift operations by assisting with continuous patrols, bed-exit alerts, fall-related monitoring, abnormal-event notifications, broader monitoring coverage, sleep-quality monitoring support and basic health-monitoring visibility.

If night-shift patrols become more consistent, abnormal events are identified earlier, resident rest patterns become more visible, and caregiver walking burden is reduced, part of the inefficient manpower pressure and avoidable overtime may be reduced.

The value of HIT-1 during night shift is not only labour saving. It also lies in improving visibility, consistency, response traceability, night-time observation, documentation quality and management confidence during the most vulnerable operating hours.

HIT-1 should not be presented as replacing night-shift caregivers or making medical decisions. Its value is to support caregivers with better night-time workflow visibility, alert support and care-operation evidence.

Technical and Compliance Language

Night-shift value should be assessed through **AI-assisted patrol optimisation, abnormal-event response visibility, sleep and health-monitoring visibility, overtime-impact analysis and audit-ready operational logs**.

Technical Indicator	Evaluation Metric	Quantification Method	Decision Purpose
Patrol continuity	Whether scheduled patrol routes are completed	Route-completion rate; completed patrol rounds per shift; missed patrol count	Assess whether night-shift patrol discipline and coverage can be maintained
Monitoring coverage	Whether monitoring coverage improves	Number of monitored rooms / zones; monitoring frequency; coverage percentage	Assess whether the institution can improve night-time visibility
Bed-exit alert support	Whether bed-exit events are detected and escalated	Number of bed-exit alerts; alert-to-confirmation time; response completion record	Assess whether bed-exit risk can be detected and responded to more consistently
Fall-related monitoring	Whether fall-related risk alerts are generated and reviewed	Number of fall-related alerts; verified events; false-alert rate; missed-event review	Assess whether fall-risk visibility and response evidence can be improved
Sleep-quality monitoring support	Whether sleep-related patterns and night-time rest interruptions can be observed	Sleep-duration trend; bed-exit frequency; night-time movement pattern; abnormal rest-interruption alerts	Assess whether night-shift teams can gain better visibility into resident rest patterns, subject to privacy and clinical-boundary controls
Health-monitoring visibility	Whether basic health-related indicators can support earlier care attention	Vital-sign trend logs; abnormal-condition alerts; escalation records; nursing review notes	Assess whether caregivers and supervisors can obtain better monitoring visibility without treating HIT-1 as a diagnostic or clinical decision-making system
Alert timeliness	Time from abnormal event to system alert	Average alert-generation time; median alert time; delayed-alert count	Assess whether abnormal-event discovery can be accelerated

Technical Indicator	Evaluation Metric	Quantification Method	Decision Purpose
Escalation speed	Time from alert to human confirmation or response	Alert-to-acknowledgement time; alert-to-arrival time; escalation completion rate	Assess whether caregiver response can become faster and more traceable
False positives / false negatives	Accuracy and reliability of alerts	False-positive rate; missed-alert rate; periodic incident review	Assess whether alert reliability is acceptable for institutional deployment
Manual round reduction	Reduction in repetitive manual patrols	Manual patrol rounds before vs after deployment; caregiver walking time reduced	Assess whether repetitive caregiver walking burden can be reduced
Caregiver fatigue reduction	Reduction in low-value physical walking and repeated checking	Estimated walking distance reduced; repeated-checking time reduced; caregiver feedback	Assess whether night-shift fatigue pressure can be lowered
Overtime impact	Change in overtime hours attributable to workflow support	Overtime hours before vs after deployment; overtime cost comparison	Assess whether night-shift manpower pressure and labour cost can be reduced
Documentation and audit trail	Whether night-shift events are recorded clearly	Patrol logs; alert logs; response logs; sleep-related observation logs; timestamp completeness	Assess whether night-shift operations become more auditable, reviewable and defensible
Family confidence	Whether night-time safety communication improves	Family feedback; complaint trend; incident explanation quality	Assess whether the institution can strengthen family confidence in night-time care

The technical value lies in **AI-assisted patrol optimisation, risk-response support, sleep and health-monitoring visibility, workload visibility and audit-ready night-shift governance**.

Any quantified night-shift benefit should be validated through local pilot data, caregiver feedback, response logs, actual overtime records, resident suitability review, privacy controls and institution-specific workflow assessment.

4. ROI and Payback Assessment

Q8. How should a nursing home evaluate the ROI of HIT-1?

Commercial Language

A nursing home should not evaluate HIT-1 only by asking:

“How long does it take to recover the cost?”

That is an important question, but it is not enough.

A more complete ROI assessment should ask whether HIT-1 can reduce repetitive manpower burden, reduce night-shift and overtime pressure, improve care-service consistency, strengthen family confidence, support premium-care positioning and create a scalable model for future deployment.

HIT-1’s ROI has two layers:

- **Quantifiable ROI:** labour hours, overtime, workflow efficiency, documentation efficiency and operating-cost savings;
- **Strategic ROI:** brand value, service upgrading, family confidence, smart eldercare positioning, governance readiness, ethical deployment readiness and long-term institutional competitiveness.

A proper ROI assessment should also distinguish between **TCV** and **TCO**. **TCV**, or Total Contract Value, reflects the total contract value payable under the customer contract. **TCO**, or Total Cost of Ownership, reflects the institution's broader long-term ownership and operating cost, including internal workflow adjustment, training, supervision and adoption costs.

HIT-1's ROI should also include governance and ethical deployment value. For institutional eldercare, a system that improves auditability, responsibility mapping, human oversight, resident dignity, privacy protection and family trust may create value beyond direct labour-cost savings.

In practical terms, HIT-1 should be assessed not only as a device purchase, but as a possible operating infrastructure that may support cost control, workflow discipline, care-operation visibility, governance preparedness, ethical deployment and long-term service differentiation.

Technical and Compliance Language

A proper ROI assessment should not rely on a single payback figure. It should combine **TCV, TCO, ROI, payback period, risk-adjusted operational value, governance readiness and ethical deployment value**.

Total Contract Value / Customer Investment Formula:

TCV = Initial Contract Price + Deployment / Installation Fees + Software / Service Fees + Maintenance / Upgrade Fees + Training and Workflow-Redesign Fees

Total Cost of Ownership Formula:

TCO = TCV + Internal Operating Cost + Internal Training Cost + Staff Supervision Cost + Workflow-Adjustment Cost

Basic ROI Planning Formula:

$$\textbf{ROI (\%)} = \frac{\text{Annual Quantifiable Benefit-Annual Operating Cost}}{\text{Initial Investment Cost}} \times 100$$

Where:

Annual Net Quantifiable Benefit = Annual Quantifiable Benefit − Annual Operating Cost

Therefore:

$$\textbf{ROI (\%)} = \frac{\text{Annual Net Quantifiable Benefit}}{\text{Initial Investment Cost}} \times 100$$

$$\textbf{ROI (\%)} = \frac{\textbf{Annual Quantifiable Benefit} - \textbf{Annual Operating Cost}}{\textbf{Initial Investment Cost}} \times 100$$

Payback Period Formula:

Payback Period = Initial Investment Cost ÷ Annual Net Quantifiable Benefit

Risk-Adjusted Institutional Value

Risk-Adjusted Institutional Value = Quantifiable Operating Benefit + Risk-Reduction Value + Governance Readiness Value + Ethical Deployment Value

These formulas are planning tools only. They should not be interpreted as guaranteed financial return, confirmed cost savings, clinical validation, regulatory approval or staffing-reduction commitment.

ROI Assessment Table:

ROI Component	Evaluation Metric	Quantification Method	Decision Purpose
Total Contract Value	Contract price, deployment, service, maintenance, training and workflow-redesign fees	Sum of all contract-linked payable items	Assess the customer's contractual investment commitment
Total Cost of Ownership	TCV plus internal operating, training, supervision and workflow-adjustment costs	TCV + internal cost items over the assessment period	Assess the institution's true long-term cost burden
Initial investment	Hardware, installation, deployment and configuration cost	Total upfront cost	Assess investment entry cost
Operating cost	Maintenance, software, remote support and system operation	Monthly / annual operating cost	Assess long-term operating sustainability
Labour-hour release	Routine caregiver hours released	Hours saved per shift × shifts per year	Estimate quantifiable workload-release value
Overtime reduction	Avoidable overtime hours reduced	Overtime hours reduced × overtime wage rate	Assess whether labour-cost pressure may decline
Night-shift support value	Patrol coverage, alert response and reduced manual rounds	Pre- and post-deployment comparison	Assess whether night-shift workload pressure can be reduced
Documentation efficiency	Time saved in routine logging and reporting	Documentation time before vs after deployment	Assess whether management review and audit readiness improve
Risk-adjusted value	Better event traceability, response logs and workflow visibility	Incident logs, response records, audit evidence	Assess whether operational-risk visibility improves
Governance readiness value	SOP clarity, responsibility matrix, audit logs, escalation workflow and management review evidence	Governance checklist score; SOP completeness; audit-log coverage; incident-review records	Assess whether HIT-1 strengthens institutional oversight, accountability and regulatory preparedness
Ethical deployment value	Resident dignity, consent process, human oversight, privacy protection and non-replacement positioning	Resident / family feedback; consent documentation; human-in-the-loop records; ethics-review checklist	Assess whether HIT-1 can be deployed in a responsible, human-centred and ethically acceptable manner

ROI Component	Evaluation Metric	Quantification Method	Decision Purpose
Staff adoption	Caregiver usage and acceptance	Training completion, active usage rate, staff feedback	Assess whether ROI assumptions are operationally realistic
Resident acceptance	Resident interaction and comfort level	Interaction rate, refusal rate, complaints, feedback	Assess whether deployment is suitable for the resident environment
Strategic value	Brand differentiation, family confidence and smart-care positioning	Qualitative management review and market feedback	Assess broader institutional value beyond direct cost saving
Payback period	Time required to recover investment	Initial investment ÷ annual net quantifiable benefit	Assess financial reasonableness
Three-year / five-year TCO	Total ownership cost over a multi-year period	TCV + internal operating cost + maintenance + training + workflow-adjustment cost	Compare long-term cost against the traditional operating model

All TCV, TCO, ROI, payback-period and risk-adjusted value calculations should be treated as **institution-specific planning estimates**. They must be based on local staffing costs, shift structure, resident profile, actual utilisation, supervision burden, maintenance cost, staff adoption, resident acceptance, governance controls, ethical safeguards and verified pilot data.

They should not be presented as guaranteed cost savings, guaranteed investment return, clinical proof, regulatory approval or proof of staffing reduction.

Q9. Is the ROI of HIT-1 only reflected in labour cost savings?

Commercial Language

No. If HIT-1 is assessed only by labour cost savings, its value will be underestimated.

Labour-cost saving is only one part of the ROI. In real eldercare operations, the broader value of HIT-1 may also come from more stable night-shift management, faster abnormal-event response, more consistent care workflows, better documentation, stronger digital management capability, improved family confidence, enhanced institutional branding, premium service positioning, governance readiness and future smart eldercare scalability.

In other words, HIT-1 should not be evaluated only as a labour-saving tool. It should be evaluated as a multi-layer operating platform that may support cost control, service quality, operational visibility, governance readiness, resident and family experience, and long-term institutional competitiveness.

Technical and Compliance Language

HIT-1's ROI should be evaluated across multiple layers:

ROI Layer	Value Source	Evidence or Metric	Decision Meaning
Direct labour ROI	Reduction of repetitive manual workload	Repetitive work hours reduced; routine patrols	Assess whether HIT-1 can reduce low-value manual workload

ROI Layer	Value Source	Evidence or Metric	Decision Meaning
		reduced; caregiver time released	
Overtime ROI	Potential reduction in inefficient or avoidable overtime	Overtime hours before vs after deployment; overtime cost trend	Assess whether manpower pressure and labour cost may decline
Workflow ROI	More consistent patrols, reminders, documentation and task completion	Patrol completion rate; reminder completion rate; task completion logs	Assess whether care workflows become more standardised and manageable
Night-shift ROI	Better night-shift visibility and response support	Night patrol coverage; alert response time; bed-exit and fall-related alert records	Assess whether the most vulnerable operating period becomes more controllable
Documentation ROI	More structured operational logs and reports	Log completeness; timestamp accuracy; report usability	Assess whether management review and audit readiness can improve
Risk-management ROI	Improved abnormal-event traceability and response visibility	Incident logs; escalation records; response time; review evidence	Assess whether operational blind spots and response uncertainty can be reduced
Governance ROI	Stronger SOP discipline, responsibility mapping and oversight evidence	SOP checklist; responsibility matrix; audit-log coverage; management review records	Assess whether institutional accountability and regulatory preparedness are strengthened
Ethical deployment ROI	Better support for dignity, consent, human oversight and non-replacement positioning	Resident / family feedback; consent records; human-in-the-loop records; ethics checklist	Assess whether deployment is responsible, human-centred and acceptable
Resident / family experience ROI	Better communication, companionship, transparency and confidence	Family feedback; resident acceptance; complaint trend; interaction records	Assess whether HIT-1 supports trust and care-service experience
Strategic platform ROI	Foundation for scalable AI-enabled eldercare operations	Multi-site readiness; integration potential; standardised deployment model	Assess whether HIT-1 can support long-term smart eldercare development
Brand and market ROI	Technology-enabled eldercare positioning	Market feedback; premium-care package acceptance; occupancy or enquiry trends	Assess whether HIT-1 supports institutional differentiation
Audit-readiness ROI	Better evidence for care operations and incident review	Access logs; patrol logs; alert logs; response logs; review reports	Assess whether the institution can better evidence and defend its operating process

Therefore, HIT-1's ROI should be understood as a combination of **financial ROI, operational ROI, risk-management ROI, governance ROI, ethical deployment ROI and strategic platform ROI**.

It should not be presented only as direct labour-cost saving, and it should not be interpreted as a guaranteed financial return or staffing-reduction proof.

5. Technical Capabilities and Care Scenarios

Q10. What eldercare scenarios can HIT-1 support?
Commercial Language

HIT-1 can support a wide range of institutional eldercare scenarios, including night-shift patrols, fall and bed-exit alerts, vital-sign monitoring support, sleep-quality observation, resident interaction and companionship, medication reminders, activity announcements, family video communication, chronic-disease management support, basic care documentation support, visitor guidance, simple delivery and broadcasting tasks.

Together, these functions may help eldercare institutions improve safety, workflow efficiency, service quality, resident engagement, family confidence and institutional differentiation.

From a commercial perspective, HIT-1 is not limited to one single use case. It is designed to support multiple routine care, safety, communication and service scenarios within an institutional eldercare environment.

Technical and Compliance Language

Technically, HIT-1's functions can be grouped into the following categories:

Category	Supported Functions	Institutional Value	Compliance Boundary
Safety Support	Fall detection, bed-exit alerts, patrol monitoring, emergency alerts, fire / flammable gas detection where configured	Supports earlier attention to safety risks and improves night-time risk visibility	Supports care attention and escalation; does not eliminate all safety risks
Health Monitoring Support	Vital-sign monitoring, abnormal-condition alerts, connected-device data support	Improves basic health-monitoring visibility and supports earlier nursing review	Does not replace medical diagnosis, clinical judgement or licensed healthcare professionals
Sleep-Quality Monitoring Support	Sleep-duration observation, night-time movement patterns, bed-exit frequency, abnormal rest-interruption alerts	Supports better night-time observation, resident rest-pattern visibility and early care attention	Supports care observation only; does not diagnose sleep disorders or replace clinical assessment
Night-Shift Patrol Support	24/7 ward rounds, night patrols, abnormal-condition notifications, route-based monitoring	Strengthens night-shift coverage and reduces repetitive manual patrol burden	Requires human confirmation, escalation SOP and audit logs
Care Workflow Support	Ward rounds, reminders, broadcasting, documentation support, care-task prompts, remote communication	Supports more consistent care workflow, reminders and operational records	Supports workflow discipline; does not replace institutional care responsibility
Medication Reminder Support	Scheduled medication reminders and care-task prompts	Helps standardise reminder processes and reduce missed routine reminders	Does not replace medication administration responsibility or professional medication management
Resident Engagement Support	Chatting, companionship, psychological support communication, activity assistance, exercise guidance	Supports resident interaction, emotional engagement and social participation	Must respect dignity, consent, privacy and human-supervised use

Category	Supported Functions	Institutional Value	Compliance Boundary
Family Connection Support	Video calls, family communication support, resident-family interaction	Enhances family connection, transparency and confidence	Requires privacy protection, consent and access control
Chronic-Disease Management Support	Connected-device monitoring, automated records, routine trend visibility	Supports long-term monitoring visibility and care-review preparation	Not a diagnostic or treatment system; requires professional review
Visitor and Guidance Support	Greeting, visitor guidance, inspection guidance, tour assistance	Improves institutional service image and visitor experience	Should be used for guidance and communication only
Activity and Broadcasting Support	Meal announcements, activity notifications, outdoor-time reminders, audio / video playback	Reduces repetitive announcement workload and improves service consistency	Content should be controlled, appropriate and auditable
Delivery Assistance	Delivery of afternoon tea, meals, parcels or simple items where configured	Reduces low-value delivery workload and supports service efficiency	Must be limited to safe, approved delivery scenarios
Documentation and Audit Support	Logs, patrol records, alert records, response records, care-operation data	Supports management review, audit readiness and incident traceability	Records must comply with data protection, retention and access-control rules

HIT-1 should therefore be understood as a **multi-scenario care-support platform**, covering safety support, health-monitoring visibility, care workflow support, resident engagement, family connection and institutional service operations.

Its functions should be deployed under human supervision, clear SOPs, data-protection controls, audit logs and clinical-boundary safeguards.

Q11. Why is it repeatedly emphasised that HIT-1 is not a replacement for caregivers?

Commercial Language

Because eldercare is ultimately human care.

Older residents need more than reminders, patrols and alerts. They need emotional connection, human reassurance, professional judgement, empathy, dignity, trust and experienced caregiving.

HIT-1 is therefore best positioned as a tool that **supports caregivers**, not a tool that replaces them. Its role is to help reduce repetitive workload, improve night-shift visibility, support reminders, strengthen documentation and assist care teams in routine operational tasks.

This positioning is also important for staff acceptance. If HIT-1 is presented as a “replacement for caregivers”, care teams may resist it. If it is presented as a “care-support tool”, caregivers are more likely to see it as a system that helps reduce pressure and allows them to spend more time on higher-value human care.

This positioning is also more acceptable to eldercare institutions, government agencies, healthcare professionals, families and compliance officers.

Technical and Compliance Language

From a product-risk, ethical and regulatory-positioning perspective, HIT-1 should be defined as a:

Human-supervised care support system

not as an:

Autonomous caregiver replacement system

This distinction is critical because it clarifies that:

Governance Point	Positioning Boundary	Deployment Rationale
Human judgement	Humans retain final judgement and care responsibility	Preserves professional accountability and avoids over-reliance on AI
AI output	AI outputs are assistive signals, not final decisions	Ensures AI supports human review rather than replacing human judgement
Care responsibility	Responsibility remains with the institution and professional staff	Maintains clear institutional and professional accountability
Clinical boundary	HIT-1 does not replace medical diagnosis, clinical judgement or licensed professional care	Avoids medical overclaiming and reduces regulatory / liability risk
Staff role	Caregivers remain central to resident care, emotional support and abnormal-event handling	Supports staff acceptance and prevents misunderstanding as staff displacement
Ethical boundary	Resident dignity, consent, privacy and human connection must be preserved	Ensures responsible, human-centred and ethically acceptable deployment
Liability boundary	HIT-1 supports documentation and alerts, but does not remove institutional accountability	Clarifies that the system supports evidence and escalation, not liability transfer
Adoption boundary	The system should be introduced as workflow support, not staff displacement	Improves caregiver acceptance and supports practical implementation

This helps ensure that HIT-1 is deployed as a **human-in-the-loop, caregiver-support and institution-supervised platform**, while clinical, operational and ethical accountability remains clear.

6. Data, System Integration and Engineering Perspective

Q12. What are the key questions that data engineers should ask about HIT-1?

Commercial Language

From an implementation perspective, data engineers will not only ask whether the robot can move, speak or perform care-support functions.

They will ask more fundamental questions:

- Where does the data come from?
- What type of data is collected?
- Where is the data stored?
- Who owns the data?
- Who can access the data?
- Can access be controlled and audited?
- Can the system integrate with existing institutional systems?
- Can alerts and incidents be traced?
- How are robot-side, edge-side and cloud-side processing separated?
- How is data protected?
- How is remote maintenance controlled?
- Is the deployment aligned with PDPA or applicable local privacy requirements?
- Can the institution defend the system's data and operational records during audit or incident review?

If these questions are not clearly answered, large-scale institutional deployment will be difficult.

For institutional buyers, the core issue is not only whether HIT-1 has AI functions. The more important issue is whether the system has a clear **data responsibility chain, system responsibility chain and audit responsibility chain**.

Technical and Compliance Language

Data engineers should review HIT-1 through a regulated deployment architecture covering **data flow, system integration, access control, audit logs, AI governance and operational accountability**.

The key principle is:

System administration does not equal data ownership.

A cloud provider, system vendor or technical administrator may help operate or maintain the system, but this does not mean they own the institution's data or have unrestricted access to resident-related information.

Technical Assessment Table

Technical Area	Key Engineering Question	Required Control / Evidence	Responsibility Boundary
Data source mapping	What data is collected by HIT-1, sensors, connected devices or user inputs?	Data inventory, data-source list, device data map	Institution and vendor must agree what data is collected and why
Data classification	Is the data operational, personal, health-related, video, audio or system-log data?	Data-classification matrix	Higher-sensitivity data requires stricter controls
Data ownership	Who owns the resident, operational and institutional data?	Data ownership clause, data governance policy	Institution should retain data-control rights unless otherwise agreed
System administration	Who manages the system, user accounts and technical configuration?	Admin-role matrix, access-control policy	Administration rights do not equal ownership rights

Technical Area	Key Engineering Question	Required Control / Evidence	Responsibility Boundary
Access control	Who can view, edit, export or delete data?	Role-based access control, least-privilege design	Access must be limited to authorised roles
Data storage	Where is data stored: robot-side, edge-side, local server or cloud?	Hosting architecture, storage-location record	Storage location must support privacy and compliance review
Cloud / edge / robot separation	Which processing occurs on the robot, edge device or cloud platform?	Processing-flow diagram, architecture map	Processing responsibilities should be technically separated and documented
Encryption	Is data protected during transmission and storage?	Encryption policy, key-management process	Encryption reduces unauthorised access risk
API and interoperability	Can HIT-1 integrate with existing care-management, EMR, CRM or family-communication systems?	API documentation, integration test record	Integration should be phased and permission-controlled
Audit logs	Can access, alerts, changes, maintenance and incidents be traced?	Access logs, alert logs, change logs, maintenance logs	Audit logs support accountability and incident review
Incident traceability	Can the institution reconstruct what happened after an event?	Event timeline, response records, escalation logs	Institution must be able to review and defend operational actions
AI governance	How are AI outputs generated, reviewed and monitored?	AI-output logs, model-control documentation, human-review records	AI outputs are assistive signals, not final decisions
Remote maintenance	Can vendors access the system remotely, and under what conditions?	Remote-access approval, session logs, maintenance records	Vendor access must be controlled, time-limited and logged
Data retention and deletion	How long is data kept, and how is it deleted or exported?	Retention policy, deletion records, export process	Retention must align with institutional and legal requirements
Cross-border data transfer	Is any data transferred outside the deployment jurisdiction?	Transfer assessment, hosting review, contractual safeguards	Cross-border transfer must be reviewed before deployment
PDPA / privacy alignment	Does deployment follow applicable privacy principles?	Data-minimisation review, consent / authorisation process, privacy notice	Privacy compliance remains an institutional and contractual responsibility
Cybersecurity	How are system access, updates and vulnerabilities managed?	Security policy, update logs, vulnerability-management process	Cyber controls protect resident data and system continuity
Accountability chain	Who is responsible for data, system operation, alerts, maintenance and incident review?	Responsibility matrix, SOPs, escalation workflow	Clear responsibility prevents gaps during incidents

Five-Layer Technical Governance Logic

HIT-1 should be understood through a five-layer governance architecture:

Layer	Technical Meaning	Governance Function
Execution Layer	HIT-1 robot, sensors and connected devices	Captures operational and care-support signals
Data Layer	Data collection, storage, pseudonymisation and privacy controls	Protects data quality, privacy and lawful use

Layer	Technical Meaning	Governance Function
AI Governance Layer	AI models, alert logic, explainability and human review	Ensures AI remains assistive and reviewable
Audit Layer	Logs, timestamps, decision records and incident trails	Makes system actions traceable and defensible
Regulatory Layer	PDPA, healthcare compliance, institutional SOPs and governance rules	Aligns deployment with regulatory and institutional expectations

Closing Position

For data engineers, the deployment question should not be:

"Can HIT-1 be connected?"

The correct question is:

"Can HIT-1 be connected, governed, audited, secured and defended within the institution's regulated care environment?"

This is why data architecture, auditability and governance controls are not optional technical details. They are part of the regulated deployment infrastructure.

Q13. Can HIT-1 be integrated with a nursing home's existing systems?

Commercial Language

Integration can be explored, but it should not be promised too broadly or too early.

Different nursing homes have different levels of digital readiness. Some institutions may have mature care-management systems, electronic medical records, internal dashboards, family communication platforms or CRM systems. Others may still rely on Excel, paper records or messaging tools.

The responsible approach is to first assess the institution's current IT environment, identify the required data points, confirm API or interface availability, define data permission and ownership, review cybersecurity and privacy requirements, start with limited integration and then expand gradually.

In commercial terms, HIT-1 should be positioned as an **integration-ready care-support platform**, not as a system that automatically connects to every nursing home system without engineering review.

System integration should therefore be treated as a controlled engineering and governance process, not a simple plug-and-play sales commitment.

Technical and Compliance Language

From an engineering perspective, HIT-1 integration should be understood as a **multi-layer system integration process** involving robotics, AI, sensor data, edge computing, cloud services, institutional IT systems, access control, cybersecurity, audit logs and operational accountability.

The key question is not only:

"Can HIT-1 connect to the nursing home system?"

The more important question is:

"Can HIT-1 connect securely, lawfully, traceably and reliably, while preserving data ownership, access control, audit logs, privacy protection and human oversight?"

System integration should follow a controlled, phased and engineering-standardised approach. HIT-1 should not be connected to institutional systems through ad hoc scripts, informal data exports or undocumented access. Each integration phase should define interface type, endpoint rules, data schema, authentication mechanism, authorisation logic, logging requirement, error-handling process, failover procedure and acceptance criteria.

A. Phased Integration Architecture

Phase	Integration Scope	Interface Standard	Data Format / Schema	Security / Access Control	Audit / Logging Requirement	Acceptance Criteria
Phase 1: Standalone Deployment	HIT-1 operates independently and generates robot logs and operational reports	Local dashboard, scheduled report export, secure local REST endpoint where configured	CSV, JSON, PDF operational reports; standardised robot log schema	Local admin account; role-based access; password / device-level control	Robot operation logs, patrol logs, alert logs, device-status logs	Robot can generate complete patrol, alert and device-status records without external system dependency
Phase 2: Nursing Station Dashboard Integration	HIT-1 sends alerts, patrol status and device status to a nursing-station dashboard	HTTPS REST API, secure WebSocket, MQTT over TLS where configured	JSON event payload; timestamped alert schema; device-status schema	API key, OAuth 2.0, device certificate or SSO where available	API access logs, alert delivery logs, acknowledgement logs, user action logs	Dashboard can receive, display, acknowledge and record alerts with timestamp integrity
Phase 3: Care-Management System Integration	HIT-1 connects with nursing-home care-management or internal workflow systems	RESTful API, secure API gateway, webhook callback, middleware connector	Resident ID mapping, task ID mapping, event-code mapping, care-task schema	Role-based access control, least-privilege permission, data-minimisation rules	Data exchange logs, task update logs, error logs, interface version logs	HIT-1 data can be mapped accurately to care workflow records without duplicate, incorrect or unauthorised entries
Phase 4: EMR / HIS / CRM /	Integration with EMR,	REST API, HL7 / FHIR	FHIR-compatible	Strong authentication,	Resident data access logs,	Data exchange complies with

Phase	Integration Scope	Interface Standard	Data Format / Schema	Security / Access Control	Audit / Logging Requirement	Acceptance Criteria
Family Communication Integration	HIS, CRM or family communication platforms where appropriate	interface where applicable, secure middleware	resources where applicable; structured care-event records; communication logs	user authorisation, consent control, access segmentation	communication logs, consent logs, change logs	institutional approval, privacy rules and clinical-boundary controls
Phase 5: Multi-Site / External Network Integration	Multi-site deployment, group-level dashboard, government / insurer / regional care-network interface subject to approval	API gateway, secure data exchange hub, private network, VPN or dedicated integration layer	Aggregated reporting schema; de-identified / pseudonymised dataset where required	Cross-site access control, tenant separation, encryption key management	Cross-site audit logs, data-transfer logs, administrative action logs	Multi-site data is separated, traceable, permission-controlled and suitable for institutional or regulatory review

B. Engineering Interface Specification

Interface Module	Endpoint / Interface	Method / Protocol	Core Payload Fields	Engineering Requirement	Acceptance Criteria
Device Heartbeat	Device Availability	Secure Exchange	Operational Metadata	Availability Monitoring	Offline Status Visibility
Device Status	Device Status	Secure Exchange	Status Metadata	Status Traceability	Status Dashboard Visibility
Patrol Route Record	Patrol Record	Secure Exchange	Patrol Metadata	Route Traceability	Patrol Reconstruction
Alert Event	Alert Event	Secure Alerting	Alert Metadata	Unique Alert Tracking	Alert Auditability
Alert Acknowledgement	Acknowledgement	Secure Confirmation	Acknowledgement Metadata	Human Confirmation Record	Acknowledgement Timing
Response Closure	Response Closure	Secure Closure	Response Metadata	Authorised Closure Record	Incident Reviewability
Care Task Record	Care Task Record	Secure Task Update	Task Metadata	Workflow Version Control	Task Status Visibility
Resident ID Mapping	Resident Mapping	Controlled Mapping	Reference Metadata	Pseudonymised Mapping	Controlled Data Linkage
Health Observation	Health Observation	Secure Observation	Observation Metadata	Care-Review Boundary	Trend Review Support
Sleep Observation	Sleep Observation	Secure Observation	Sleep Metadata	Privacy-Controlled Review	Sleep-Pattern Visibility
Family Communication Log	Communication Log	Secure Communication	Communication Metadata	Consent-Aware Logging	Privacy-Controlled Audit
Maintenance Session	Maintenance Session	Controlled Service Access	Service Metadata	Approved Service Access	Vendor Access Review
Audit Log Export	Audit Export	Authorised Export	Audit Metadata	Controlled Export	Review Package Readiness

Interface Module	Endpoint / Interface	Method / Protocol	Core Payload Fields	Engineering Requirement	Acceptance Criteria
Error Event	Error Event	Secure Error Reporting	Fault Metadata	Standardised Fault Tracking	Fault Diagnosis Support

C. Interface-Level Engineering Requirements

Engineering Area	Required Specification
API Protocol	RESTful API over HTTPS should be preferred for structured data exchange. MQTT over TLS may be used for IoT-style device messaging where suitable. WebSocket may be used for real-time dashboard alerting where latency matters.
Data Format	JSON should be preferred for API payloads. CSV may be used for controlled report export. PDF may be used for human-readable management reports but should not be the primary machine-readable format.
Data Schema	Each data object should define field name, field type, allowed value, mandatory / optional status, timestamp format, device ID, resident ID mapping method and event category.
Timestamp Standard	All events should use a consistent timestamp format, preferably ISO 8601, with timezone clearly defined.
Identity Mapping	Resident, device, caregiver, task and event identifiers should be mapped through a controlled ID-mapping table to avoid duplicate or incorrect records.
Authentication	API access should use API keys, OAuth 2.0, device certificates, SSO or other institution-approved authentication mechanisms. Shared generic accounts should be avoided.
Authorisation	Access should follow role-based access control and least-privilege principles. Different roles should have different permissions for viewing, acknowledging, editing, exporting or deleting data.
Encryption	Data should be encrypted in transit using TLS. Sensitive data at rest should be encrypted according to the institution's data-security policy.
Network Port Control	Required ports should be documented, approved, minimised and whitelisted. Unnecessary open ports should not be allowed.
Firewall / VPN	External access should be protected through firewall rules, VPN, private network tunnel or secure API gateway where appropriate.
Audit Logs	All API calls, alert events, acknowledgements, user actions, system changes, remote-maintenance sessions and data exports should be logged.
Error Handling	The interface should define retry logic, timeout rules, failed-delivery alerts, duplicate-event handling and manual fallback procedures.
Failover	If API, network or cloud connection fails, HIT-1 should support safe fallback operation, local logging and later synchronisation where technically feasible.
Data Retention	Retention period, deletion rules, export process and archival requirements should be defined before deployment.
Version Control	API versions, firmware versions, data-schema versions and integration changes should be documented and controlled.
Testing	Integration should include unit testing, API testing, security testing, user-acceptance testing and pilot validation before production deployment.
Change Management	Any change to API, data schema, AI model, alert threshold, access control or hosting environment should go through documented approval and testing.

D. Recommended Standard Data Objects

Data Object	Key Fields
Device Status Record	Device ID, battery level, connectivity status, location / zone, firmware version, error code, timestamp
Patrol Record	Patrol ID, device ID, route ID, start time, end time, completion status, missed point, operator acknowledgement
Alert Record	Alert ID, alert type, severity level, location / zone, event time, system alert time, confidence level where applicable
Response Record	Alert ID, caregiver ID, acknowledgement time, response time, escalation status, closure status, review note
Task Record	Task ID, task type, scheduled time, completion time, assigned role, completion status, exception reason
Resident Interaction Record	Interaction ID, interaction type, duration, resident ID mapping, consent status, feedback where applicable
Health-Monitoring Observation Record	Observation ID, data source, vital-sign trend / sleep-related observation, abnormal flag, review status
Maintenance Record	Maintenance ID, device ID, remote / onsite support, technician ID, session start and end time, change summary
Audit Record	User ID, role, action type, data object accessed, timestamp, IP / device source, success / failure status

E. Engineering Acceptance Criteria

Before production integration, the following engineering acceptance criteria should be satisfied:

Acceptance Area	Minimum Requirement
API Availability	API endpoint, method, payload, response code and error code are documented
Data Schema	Mandatory fields, optional fields, data type, enum values and timestamp format are defined
Security	Authentication, authorisation, TLS encryption and access control are tested
Logging	API calls, alerts, acknowledgements, data exports and remote-maintenance sessions are logged
Data Quality	Duplicate handling, missing-field handling and invalid-value handling are tested
Failover	Network failure, API timeout and robot offline scenarios have fallback procedures
Auditability	System can reconstruct event timeline from alert to human response
Privacy	Resident identifiers are minimised, pseudonymised or access-controlled where required
User Acceptance	Nursing station users can receive, acknowledge and close alerts correctly
Change Control	API, firmware, model and schema changes are version-controlled

Engineering Closing Statement

Further interface refinement should be conducted with the institution's data engineering, IT, cybersecurity and compliance teams. The final integration design should define API

specifications, data schemas, endpoint rules, authentication mechanisms, authorisation logic, encryption requirements, network-port controls, audit-log requirements, error-handling rules, failover procedures, testing standards and phased deployment acceptance criteria.

HIT-1 system integration should therefore be treated as a controlled engineering and governance process, not a simple plug-and-play connection.

Q14. Does HIT-1 require Singapore-based cloud or local data hosting?

Commercial Language

For Singapore eldercare institutions, HIT-1 should be positioned as a **localised deployment and institution-controlled care-support platform**.

This means that HIT-1 is not intended to be deployed as an uncontrolled offshore data system. Where resident data, health-related information, video communication, patrol logs, alert records or government-related reporting may be involved, the deployment should consider Singapore-based cloud hosting, local server hosting, edge processing or other data architecture that supports Singapore privacy, cybersecurity and institutional governance requirements.

The key message is:

HIT-1 should be deployed locally, governed locally and reviewed locally, with data hosting and access controls designed according to the institution's compliance requirements.

This localised deployment model may improve institutional confidence, reduce cross-border data concerns, support PDPA-related review, and make it easier for nursing homes, families, auditors and government-related stakeholders to understand where data is stored, who can access it and how it is protected.

Technical and Compliance Language

From a technical architecture perspective, HIT-1 deployment should follow a **local-first and compliance-controlled deployment model**.

This does not necessarily mean that every function must be hosted on a physical server inside the nursing home. Rather, it means that deployment should be designed so that data storage, processing, access control, audit logs, remote maintenance and cross-border transfer risks are clearly controlled and documented.

The preferred deployment model should consider the following hierarchy:

Deployment Layer	Technical Meaning	Localisation Requirement	Compliance Purpose
Robot-Side Local Operation	HIT-1 operates physically within the nursing home environment	Core robot operation, patrol execution, alerts and local safety functions should operate at site level	Ensures care-support functions are available within the institution's operating environment

Deployment Layer	Technical Meaning	Localisation Requirement	Compliance Purpose
Edge / Local Processing	Certain data processing occurs through local gateway, edge server or on-premise system	Sensitive or latency-critical data may be processed locally where appropriate	Reduces unnecessary cloud dependency and supports faster local response
Singapore-Based Cloud Hosting	Cloud services are hosted in Singapore or through Singapore-approved regional arrangements	Resident-related data, logs and operational records may be hosted in Singapore where required	Reduces cross-border data complexity and supports PDPA-related review
Institution-Controlled Access	Data access is controlled by institution-approved roles and permissions	Users, vendors and administrators should only access authorised data	Maintains institutional control over resident and operational data
Controlled Remote Maintenance	Vendor or technical support access is controlled, approved, time-limited and logged	No unrestricted remote access should be allowed	Reduces uncontrolled third-party access risk
Audit and Review Layer	Logs, timestamps, data export records and maintenance records are retained	Audit logs should be available for institutional review	Supports accountability, incident review and regulatory readiness

Localised Deployment Architecture

Technical Item	Recommended Position	Engineering / Compliance Meaning
Local robot deployment	HIT-1 is physically deployed and operated within the nursing home	Robot operation is site-based and linked to the institution's workflow
Local network configuration	HIT-1 should connect through authorised Wi-Fi, LAN, 4G / 5G or approved network environment	Prevents unmanaged or unauthorised network access
Local / edge processing option	Certain alerts, patrol logs and device-status data may be processed locally or through edge gateway	Supports lower latency and reduces unnecessary cloud transfer
Singapore-based cloud option	Where cloud hosting is required, Singapore-based hosting should be considered	Supports local privacy review and reduces cross-border data concern
Data localisation option	Resident-related data may be stored locally or in Singapore-hosted infrastructure where required	Supports institutional and government review
PDPA alignment	Personal data processing should follow applicable PDPA principles	Supports data protection, consent, access control and accountability
Access logs	User access, vendor access and system access should be logged	Enables audit and responsibility tracing
Encryption key control	Encryption keys should be controlled under approved security arrangements	Reduces unauthorised access and third-party data exposure
Remote O&M protocol	Remote operation and maintenance should require approval, session logging and access limitation	Controls vendor maintenance access
Incident response	Data and system incidents should have documented response procedures	Supports cybersecurity and operational incident management
Cross-border transfer review	Any transfer outside Singapore should be reviewed before deployment	Prevents unapproved or poorly controlled cross-border data flow

Data Hosting Options

Hosting Option	Description	Suitable Use Case	Key Control
On-Premise Hosting	Data is stored within the institution's own server or local infrastructure	Institutions with strict internal IT governance or sensitive deployment requirements	Institution manages infrastructure, access control and backup

Hosting Option	Description	Suitable Use Case	Key Control
Edge Gateway Hosting	Data is processed through a local gateway or edge device before limited upload	Sites requiring low-latency alerts or reduced cloud dependency	Local processing rules and synchronisation controls
Singapore-Based Cloud Hosting	Data is hosted in Singapore-based cloud infrastructure	Institutions requiring scalable cloud service while reducing cross-border concern	Singapore hosting, encryption, role-based access and audit logs
Hybrid Deployment	Some functions run locally, while selected data is synchronised to approved cloud services	Institutions balancing local control and cloud analytics	Clear data-flow map, data-classification rules and transfer control
Regional / Cross-Border Cloud	Data is hosted outside Singapore or transferred regionally	Should only be considered after legal, privacy and institutional review	Cross-border transfer assessment and contractual safeguards

Engineering Control Requirements

Control Area	Required Standard
Data-flow mapping	The system should document which data stays on the robot, which data is processed locally, which data is uploaded and which data is shared externally
Hosting-location record	The physical or cloud hosting location should be documented before deployment
Data classification	Resident data, health-related data, video / audio data, operational logs and system logs should be classified separately
Access-control matrix	Institution users, vendor users, administrators and maintenance staff should have clearly defined permissions
Encryption	Data in transit should be encrypted; sensitive stored data should follow approved encryption requirements
Remote-access control	Remote maintenance should be approved, time-limited, logged and revocable
Audit logs	Access, data export, alert handling, system changes and maintenance sessions should be logged
Data retention	Retention period, deletion rules, archival procedures and export rules should be defined
Backup and disaster recovery	Backup frequency, recovery point objective and recovery time objective should be reviewed
Incident response	Cybersecurity incident, data breach, device failure and unauthorised access response procedures should be defined
Cross-border transfer	Any cross-border data transfer should be reviewed and documented before activation

Recommended Positioning Statement

HIT-1 should be described as a **localised, institution-controlled and compliance-ready deployment platform**.

Its deployment should prioritise local operation, Singapore-based hosting or local data architecture where appropriate, role-based access control, audit logs, encryption, controlled remote maintenance and documented data-flow governance.

This positioning helps clarify that HIT-1 is not an uncontrolled offshore AI system. It is a care-support platform designed to be deployed within the institution's operating environment and governed according to local privacy, cybersecurity and institutional requirements.

7. Healthcare Compliance and Regulatory Boundaries

Q15. Does HIT-1 involve healthcare compliance and data compliance issues?

Commercial Language

Yes. Compliance is not optional.

Once HIT-1 is deployed in an eldercare institution, it may involve older residents, caregiving workflows, safety risks, health-related data, video communication, privacy protection, incident management, remote maintenance and institutional operating procedures.

Therefore, HIT-1 should not be treated as an ordinary consumer robot or a simple service device. It should be deployed as a **human-supervised, compliance-aware and institution-controlled care-support platform**.

The key point is:

Compliance is not an add-on. It is a basic requirement for responsible deployment.

For eldercare institutions, compliance does not only mean meeting legal requirements. It also helps build trust with residents, families, caregivers, regulators, insurers, auditors and government-related stakeholders.

HIT-1 completed HSA Class A medical device notification under Notification **No. MDPN260701F1560, with the notification date of 01 July 2026**. The notified product is listed as "Embodied-Intelligence Humanoid Robot for Elderly Care" with device identifier AJJ-HIT-1 and product owner AJJ Healthcare Management Pte Ltd. **The notified intended-use scope includes physiological health monitoring, fall detection, companionship and communication, medication management reminders, hazardous gas detection, sleep monitoring, continuous patient monitoring, bed-exit detection and alerts, chronic-disease management support, family communication support,orientation support, activity assistance, documentation support, and AI-generated alerts and information.** Advanced functions should continue to be reviewed against the applicable HSA regulatory scope, including potential Class B requirements where required.

Technical and Compliance Language

From a practical deployment perspective, HIT-1's regulatory and compliance issues should be mapped into a structured matrix covering **HSA notification / registration scope, functional claims, medical-device boundaries, data protection, AI governance, auditability, remote maintenance, incident escalation and accountability mapping**.

HIT-1 should be positioned as:

A human-supervised care-support system

not as:

An autonomous medical diagnosis, clinical-decision or caregiver-replacement system.

This distinction is essential because regulatory review, compliance controls and deployment obligations may differ depending on HIT-1's intended use, functional claims, data types, operating environment and system-integration level. HSA uses a risk-based approach to medical-device regulation, where riskier and more complex devices are subject to more rigorous scrutiny and review.

A. HIT-1 HSA Function Registration and Review Table

HIT-1 Functional Area	Public Disclosure / Brochure Function	Current HSA Status Based on Public Records	Class B / Further Review Trigger	Recommended Claim Boundary
Vital-Sign Monitoring	Vital-sign monitoring; health-related monitoring support	Listed within the current HSA Class A notification intended-use scope as **Physiological Health Monitoring**	If used for active patient monitoring, clinical diagnosis, treatment decision support or continuous clinical risk assessment	"Vital-sign monitoring support" and "health-monitoring visualisation"; not autonomous diagnosis
Continuous Patient Monitoring	Continuous patient monitoring; ongoing status observation; care-station visibility	Listed within the current HSA Class A notification intended-use scope as **Continuous Patient Monitoring**	If used for continuous clinical risk scoring, automated triage, treatment intervention decisions or replacement of professional monitoring responsibility	"Continuous care-observation and monitoring-visualisation support"; not autonomous clinical monitoring or automated medical judgement
Fall Detection	Fall detection; mobility safety management; abnormal safety alerts	Listed within the current HSA Class A notification intended-use scope as **Fall Detection**	If promoted as guaranteed fall prevention, automated clinical triage or high-risk medical safety decision support	"Fall-related alert and care-escalation support"; not a guarantee of fall prevention
Companionship and Communication	Psychological companionship; chatting; emotional interaction; resident engagement; communication support	Listed within the current HSA Class A notification intended-use scope as **Companionship & Communication**	If positioned as mental-health treatment, psychotherapy, depression diagnosis, clinical intervention or replacement of professional mental-health services	"Companionship and communication support"; not mental-health treatment
Medication Management	Medication reminders; care-task reminders; medication schedule management	Listed within the current HSA Class A notification intended-use scope as **Medication Management: Manages medication schedules with timely reminders**	If the system recommends medication changes, dosage changes, treatment plans, autonomous medication administration or automated medication decisions	"Medication schedule reminder support"; not medication decision-making or replacement of medication-administration responsibility
Sleep Monitoring	Sleep-quality monitoring; night-time rest-pattern observation; bed-exit frequency	Listed within the current HSA Class A notification intended-use scope as **Sleep Monitoring: Track sleep patterns**	If used to diagnose sleep disorders, clinical sleep diseases or automatically determine medical intervention	"Sleep-observation support" and "rest-pattern visualisation"; not diagnosis of sleep disorders
Hazardous Gas Detection	Fire / combustible-gas detection; environmental safety monitoring	Listed within the current HSA Class A notification intended-use scope as **Hazardous Gas Detection**	If connected to regulated emergency-response systems, or promoted as a guarantee of environmental safety protection	"Environmental safety alert support"; not a guarantee of preventing emergency incidents
Bed-Exit Detection and Alerts	Bed-exit alerts; night-time activity alerts; bed-exit monitoring	Listed within the current HSA Class A notification intended-use scope as **Bed-exit Detection and Alerts**	If promoted as clinical fall-risk prediction, automated risk stratification or	"Bed-exit detection and alert support"; subject to human confirmation

HIT-1 Functional Area	Public Disclosure / Brochure Function	Current HSA Status Based on Public Records	Class B / Further Review Trigger	Recommended Claim Boundary
			guaranteed safety intervention	
Chronic Disease Management Support	Connected-device monitoring; automatic records; chronic-disease management support	Listed within the current HSA Class A notification intended-use scope as **Chronic Disease Management Support**	If used for disease diagnosis, treatment decisions, clinical interpretation, medication adjustment or patient risk stratification, the regulatory risk level may increase	"Chronic-condition monitoring visualisation and care-review support"; not AI treatment management
Family Communication Support	Video calls; family communication; family connection	Listed within the current HSA Class A notification intended-use scope as **Family Communication Support**	If video / audio data is stored, analysed or linked to health-risk assessment, behavioural assessment or clinical judgement	"Controlled family communication support"; subject to consent, privacy and access-control rules
Orientation Support	Visitor reception; route guidance; appointment or check-up guidance; facility navigation	Listed within the current HSA Class A notification intended-use scope as **Orientation Support**	If connected to regulated clinical workflow, identity verification, sensitive data access or patient triage process	"Orientation and service-guidance support"; not clinical triage or medical judgement
Activity Assistance	Audio / video playback; activity organisation support; resident activity interaction	Listed within the current HSA Class A notification intended-use scope as **Activity Assistance**	If used for therapeutic intervention, rehabilitation therapy, clinical cognitive assessment or psychotherapy purposes	"Activity and interaction support"; not clinical therapy
Documentation Support	Logs, reminders, operational reports and care records	Listed within the current HSA Class A notification intended-use scope as **Documentation Support**	If it becomes automated clinical documentation, clinical decision records, regulated EMR integration or automated medical certification, further review is required	"Care-operation documentation support"; not automated clinical proof or certification
AI-Generated Alerts and Information	Abnormal-status alerts, risk alerts, AI-generated prompts	Listed within the current HSA Class A notification intended-use scope as **AI-generated Alerts and Information**	If AI analyses health data for clinical decision-making, risk classification, diagnosis, treatment recommendation or automated triage, Class B or higher review may be triggered	"Assistive AI output subject to human review"; not autonomous clinical decision-making
24/7 Ward Rounds / Patrol	Day-and-night patrol; route monitoring; patrol records	Not separately listed as "24/7 ward rounds" in the HSA notification wording; may be related to **Continuous Patient Monitoring, Bed-exit Detection and Alerts, Documentation Support, and AI-generated Alerts and Information**	If connected to clinical monitoring, automated patient risk scoring, regulated institutional reporting or medical triage, further review is required	"Patrol and workflow support"; not replacement of caregivers
Care Workflow Support	Care-task reminders; patrol workflow; abnormal-event escalation; care-station linkage	Not separately listed as "care workflow support" in the HSA notification wording; may be related to **Medication Management, Documentation Support, and AI-generated Alerts and Information**	If the system automatically determines care priority, clinical grading, treatment pathway or replaces professional nursing judgement, further review is required	"Care workflow support"; not automated nursing decision-making
Remote Care Coordination	Remote communication, care-team coordination, cross-team collaboration	May be supported by **Family Communication Support, Companionship & Communication, and Documentation Support**, depending on the deployment scope	If it involves remote clinical monitoring, remote diagnosis, remote treatment advice or cross-border health-data processing, further review is required	"Remote care communication and coordination support"; not remote diagnosis or remote treatment

HIT-1 Functional Area	Public Disclosure / Brochure Function	Current HSA Status Based on Public Records	Class B / Further Review Trigger	Recommended Claim Boundary
System Maintenance and Service Records	Remote maintenance, service logs, maintenance records and system updates	Not listed as a medical intended-use function; mainly a deployment, service, cybersecurity and data-governance control area	If maintenance access involves personal data, health data, AI parameters, log export or cross-border remote access, compliance review is required	"Controlled maintenance and service-record support"; not a medical function claim

Regulatory note: The above table should be understood together with the Company's current HSA Class A notification intended-use scope and publicly disclosed product materials. HIT-1 has completed HSA Class A notification, and its intended-use scope currently lists 14 notified intended-use items / functions, including Physiological Health Monitoring, Fall Detection, Companionship & Communication, Medication Management, Hazardous Gas Detection, Sleep Monitoring, Continuous Patient Monitoring, Bed-exit Detection and Alerts, Chronic Disease Management Support, Family Communication Support, Orientation Support, Activity Assistance, Documentation Support, and AI-generated Alerts and Information.

The HSA Class A notification should not be interpreted as authorising autonomous diagnosis, treatment decision-making, clinical risk stratification, automated clinical judgement or replacement of licensed nursing / medical personnel. Any function involving diagnosis, treatment, active clinical risk assessment, automated triage, regulated EMR integration, cross-border health-data processing or higher-level AI medical use should be further reviewed based on its specific intended purpose, data type, clinical impact and applicable HSA regulatory requirements.

B. Registration and Compliance Deployment Matrix

Registration / Compliance Topic	What it means for HIT-1	Practical Deployment Implication
Product positioning boundary	HIT-1 should be positioned as a human-supervised care-support system, not an autonomous caregiver-replacement or clinical-decision system	Human final judgement remains with the institution and professional staff; AI outputs are assistive only
Intended-use statement	The declared use should clearly define whether HIT-1 is used for patrols, reminders, alerts, companionship, monitoring support, documentation support or communication support	Product claims, user instructions, training materials and sales materials should remain consistent with the intended-use boundary
HSA Class A notified scope	HIT-1's current HSA Class A notified intended-use scope lists 14 notified intended-use items / functions, covering monitoring, alerts, companionship / communication, medication reminders, documentation support and AI-generated information.	Deployment wording should remain within the notified care-support, monitoring-support, communication-support, documentation-support and AI-generated alert / information boundaries unless further review is completed.
Future Class B / advanced-function review	Advanced functions may require further regulatory review depending on intended use, claims, AI logic and clinical relevance	Advanced monitoring, clinical decision support, autonomous disease management or higher-risk AI claims should be reviewed before deployment or marketing

Registration / Compliance Topic	What it means for HIT-1	Practical Deployment Implication
HSA / medical-device review	Regulatory review depends on intended use, product claims and the scope of health-monitoring functionality	Intended-use wording, functional boundaries and evidence expectations should be assessed before deployment or expansion
IEC 63310 / ISO 13482 safety relevance	These standards are relevant to human interaction, mobility, physical-contact safety and service-robot deployment environments	Safety design, risk assessment, testing and human-factors controls should be documented
ISO 13485 quality-system relevance	Where regulated health functions or device-quality processes apply, quality-system discipline becomes important	Design control, change control, traceability, supplier control and CAPA discipline should be considered
PDPA / privacy compliance	Resident data, health-related information, video / audio communication and family-contact data may be involved	Data minimisation, access control, consent / notice handling, retention and deletion rules should be defined
Data localisation / hosting control	Data hosting location may affect privacy review, institutional confidence and cross-border transfer risk	Local deployment, Singapore-based cloud or compliant data-hosting architecture should be assessed
Access control	Different users may include caregivers, nurses, managers, IT administrators, vendors and support engineers	Role-based access control and least-privilege permission should be implemented
Audit logs and traceability	Access, alerts, acknowledgements, system changes, maintenance activities and incidents should be traceable	Defensible logs, timestamps and review records support accountability and post-incident review
AI governance	HIT-1 may generate alerts, recommendations, interaction outputs or monitoring signals	Human supervision, model control, version control and no autonomous clinical judgement should be maintained
Video / audio governance	Video calls, resident interaction or audio communication may involve sensitive personal data	Consent, access control, recording policy, retention rules and privacy notices should be defined
Cybersecurity	HIT-1 may connect to local networks, cloud platforms, dashboards or institutional systems	Network security, encryption, vulnerability management and system-update control should be reviewed
Remote-maintenance governance	Vendor or technical-support access may be required for troubleshooting and upgrades	Approved access, session logging, least-privilege control and cybersecurity review are needed
Incident escalation and SOPs	Falls, abnormal events, system failure, false alerts, missed alerts and data incidents require structured response	Escalation paths, notification rules, response ownership and review procedures should be pre-defined
Accountability mapping	Responsibility should be clear among the institution, caregivers, vendor, system operator and technical-support team	Governance boundaries and contractual responsibility should be documented
Staff training	Caregivers and supervisors must understand what HIT-1 can and cannot do	Training should cover alert handling, human confirmation, privacy rules, escalation SOPs and system limitations
Resident and family communication	Residents and families may need to understand the purpose and limits of HIT-1 deployment	Communication materials should explain that HIT-1 supports care teams but does not replace human care
Deployment review	Each site may have different workflows, resident profiles, IT maturity and regulatory expectations	Site-specific risk assessment and deployment checklist should be completed before scale-up

C. Practical Registration and Claim-Boundary Table

HIT-1 Function / Claim Area	Registration / Compliance Consideration	Recommended Positioning
Vital-sign monitoring	Covered under disclosed Class A notified functional category, but higher-risk claims may require further review	"Vital-sign monitoring support" and "health-monitoring visibility", not autonomous diagnosis
Sleep-quality monitoring	Covered under disclosed Class A notified functional category, but diagnostic sleep claims should be avoided unless separately reviewed	"Sleep observation support" and "rest-pattern visibility", not diagnosis of sleep disorders
Fall detection / bed-exit alert	Fall detection is covered under disclosed Class A category; bed-exit alerts should be treated as safety-support and human-confirmation functions	"Care attention and escalation support", not guaranteed fall prevention
24/7 ward rounds	Operational workflow function; may support monitoring and safety visibility	"Patrol and workflow-support function", not replacement of human night-shift caregivers
Psychological companionship	Companionship is covered under disclosed Class A category; mental-health treatment claims should be avoided	"Companionship and engagement support", not mental-health treatment
Medication reminders	Medication management is covered under disclosed Class A category; dosage or treatment-decision claims should be avoided	"Medication reminder support", not medication decision-making
Chronic-disease management support	Not confirmed as Class A covered category; likely requires separate intended-use and claim review	"Monitoring visibility and care-review support", not treatment or clinical disease management by AI
Family video communication	Not a medical-device function by itself, but involves privacy, consent and access control	"Controlled family-communication support", subject to privacy and access rules
Documentation support	Supports operational records and audit evidence; not automatically a clinical record system	"Care-operation documentation support", not automatic legal or clinical proof
Remote support and maintenance	May involve vendor access to system environment	"Controlled remote support", subject to approval, logging and cybersecurity review
AI alerts and outputs	Regulatory relevance depends on whether AI output supports care workflow or clinical decision-making	"Assistive AI outputs", requiring human review and confirmation

D. Minimum Compliance Controls Before Deployment

Control Area	Minimum Deployment Requirement
Intended use	Define the exact intended use and functional boundaries of HIT-1 before deployment
HSA scope check	Confirm whether each deployed function falls within the disclosed Class A notified categories or requires further regulatory review
Product claims	Ensure brochures, sales materials, training documents and public statements do not overclaim medical, diagnostic, safety-guarantee or labour-replacement effects
Regulatory review	Review whether the specific deployment configuration triggers medical-device, healthcare or institutional compliance obligations
PDPA / privacy	Define personal-data handling, consent / notification, access control, retention and deletion rules
Data hosting	Confirm whether data is stored locally, in Singapore-based cloud, regional cloud or other approved architecture
Access control	Implement role-based access and least-privilege permissions

Control Area	Minimum Deployment Requirement
Human supervision	Ensure AI outputs, alerts and monitoring signals require human review where care decisions are involved
Audit logs	Record access, alerts, acknowledgements, system changes, maintenance and data exports
Incident SOP	Define escalation procedures for falls, alerts, system failures, privacy events and cybersecurity incidents
Cybersecurity	Review network access, encryption, update control, vulnerability management and remote access
Staff training	Train caregivers, managers and IT users on system use, limits, privacy and escalation procedures
Vendor governance	Define vendor responsibility, remote-maintenance rules, support scope and response obligations
Accountability matrix	Map responsibility among institution, care team, vendor, IT administrator and system operator
Site validation	Conduct site-specific pilot review before broader deployment

E. Compliance Closing Statement

Compliance is not a secondary feature of HIT-1. It is part of the product's **deployment architecture, governance architecture and market-readiness architecture**.

HIT-1 should therefore be deployed with clear intended-use boundaries, HSA scope review, human supervision, privacy protection, data-access control, audit logs, incident escalation SOPs, cybersecurity controls and responsibility mapping.

This positioning helps ensure that HIT-1 can be accepted not only as a robot product, but as a responsible, auditable and institution-ready care-support platform.

Q16. Can HIT-1 be marketed as a "medical diagnostic robot"?

Commercial Language

No. That would be inappropriate and risky.

HIT-1 should not be marketed as a medical diagnostic robot. Such a claim may create regulatory risk, liability risk and market misunderstanding.

A safer and more accurate statement is:

HIT-1 supports monitoring, alerts, care coordination and workflow assistance, but does not replace medical diagnosis or professional clinical judgement.

Technical and Compliance Language

From a technical and compliance perspective, HIT-1 should be positioned as an **AI-assisted monitoring system, a care workflow support tool and a human-supervised care coordination platform**.

It should not be positioned as an autonomous diagnostic device, an independent clinical decision-maker or a system that replaces licensed medical judgement.

This boundary is important because diagnostic claims may trigger higher regulatory scrutiny, medical-device classification issues, clinical-evidence expectations and liability exposure.

HIT-1's outputs should therefore be treated as **assistive monitoring signals and care-support information**, requiring human review where care or clinical judgement is involved.

Q17. If there is a false alert, missed alert or abnormal incident, how should liability be understood?

Commercial Language

HIT-1 is an assistive tool, not a replacement for the entire caregiving responsibility chain.

Its value is to help the institution detect earlier, alert faster, record better and trace events more clearly. However, HIT-1 cannot eliminate all care risks, safety risks, operational risks or human-response risks.

Therefore, responsibility should not be understood as a simple question of "the robot is responsible" or "the vendor is responsible". In institutional eldercare, responsibility should be understood through a clear chain of human supervision, operating procedures, system logs, response records, technical maintenance and incident review.

Before deployment, the institution should define:

- who receives alerts;
- who confirms abnormal events;
- who responds on-site;
- who records incidents;
- who reviews responsibility;
- how system faults are escalated;
- how network interruptions are handled;
- how missed alerts or false alerts are reviewed;
- how human fallback procedures operate.

In practical terms, HIT-1 supports care teams, but the institution must still maintain human response, supervision, escalation, manual backup and incident-review procedures.

Technical and Compliance Language

From a technical and compliance perspective, false alerts, missed alerts and abnormal incidents should be managed through a structured **incident-control and accountability framework**.

This framework should include alert logs, response logs, escalation workflow, failure-mode documentation, human fallback process, maintenance logs, incident-review protocol, audit evidence preservation and responsibility mapping.

The key principle is:

HIT-1 supports detection, alerting, documentation and traceability, but it does not remove institutional care responsibility or professional human judgement.

Incident-Control and Accountability Table

Control Mechanism	Control Objective	Operational Execution Requirement
Alert log	Record alert time, alert type, location and device source	Each alert should include alert ID, timestamp, device ID, location / zone, alert type and severity level
Response log	Record human acknowledgement, response time and action taken	Care staff should acknowledge alerts, record response status and close the event after review
Escalation workflow	Define who responds, when to escalate and how escalation is performed	SOP should specify first responder, supervisor escalation, emergency escalation and notification pathway
Failure-mode documentation	Record whether the issue came from system, sensor, network, configuration or workflow failure	Each abnormal incident should be classified by failure type and reviewed with supporting logs
Human fallback process	Ensure manual care procedures remain available when HIT-1 is unavailable or uncertain	Nursing home staff should maintain manual patrol, manual checking and manual response procedures
Maintenance log	Track technical intervention, software update, sensor adjustment and remote support	All maintenance actions should record technician identity, access time, change summary and approval status
Incident review protocol	Support investigation, root-cause analysis and corrective action	Each serious or repeated incident should be reviewed with timeline, evidence, responsible party and corrective action
Responsibility matrix	Clarify roles of institution, caregivers, vendor, IT administrator and support team	Responsibility should be pre-defined for alert response, technical fault, data issue, maintenance and system escalation
False alert handling	Prevent unnecessary panic and improve alert accuracy over time	False alerts should be recorded, reviewed and used to adjust workflow, thresholds or training where appropriate
Missed alert handling	Identify whether a missed alert was caused by system limitation, sensor blind spot, network issue or workflow gap	Missed events should trigger incident review, technical verification and corrective measures
Network interruption handling	Ensure care workflow continues during connectivity loss	Offline mode, local logging, manual fallback and delayed synchronisation procedures should be defined
Data and audit preservation	Preserve evidence for review, accountability and dispute handling	Relevant logs, timestamps, screenshots, exports and maintenance records should be retained according to policy
Corrective and preventive action	Reduce recurrence of similar incidents	CAPA-style review should identify root cause, corrective action, responsible owner and completion deadline

Responsibility Interpretation

Liability should be assessed based on the actual facts, including:

Review Area	Key Question
System performance	Did HIT-1 generate the alert, log or system record correctly?
Human response	Did authorised staff receive, acknowledge and respond to the alert?
SOP compliance	Was the agreed escalation and response procedure followed?
Technical fault	Was there a sensor, software, device, network or cloud-service issue?
Maintenance history	Were system updates, repairs or remote support properly recorded?
Data and logs	Are the relevant records complete, time-stamped and auditable?
Training and adoption	Were staff properly trained to use and respond to HIT-1 alerts?
Site workflow	Was the local deployment workflow properly designed and tested?
Vendor responsibility	Did the vendor meet agreed support, maintenance and technical obligations?
Institutional responsibility	Did the institution maintain human supervision, manual backup and care-response procedures?

Practical Positioning Statement

HIT-1 should not be presented as a system that removes all care risk or transfers full care responsibility away from the institution.

A more accurate positioning is:

HIT-1 supports earlier detection, faster alerting, better documentation and clearer event traceability, while human supervision, institutional SOPs, staff response and professional care responsibility remain essential.

This approach protects residents, supports caregivers, improves incident review and reduces misunderstanding about liability.

8. Government and Public-Sector Relevance

Q18. What value does HIT-1 provide to government agencies?

Commercial Language

For government agencies, HIT-1 may be relevant as a technology-enabled response to ageing population pressure, eldercare manpower shortage and long-term care productivity challenges.

It can help government agencies observe how AI and robotics may support eldercare institutions, whether human-robot collaboration can reduce caregiver pressure, whether night-shift monitoring can be improved, whether care documentation can become more structured, and whether smart eldercare pilots can be scaled responsibly.

HIT-1 is not only a product for one nursing home. It may also serve as a practical reference model for evaluating how embodied AI, robotics, data governance and human-supervised care-support systems can be introduced into institutional eldercare settings.

For public-sector stakeholders, the value of HIT-1 lies in its potential to support policy learning, pilot evaluation, regulated deployment, workforce planning and responsible smart eldercare transformation.

Technical and Compliance Language

Government evaluation may focus not only on product functionality, but also on whether HIT-1 can support **safe deployment, measurable care-operation improvement, data governance, auditability, human supervision, privacy protection and responsible scalability**.

In this context, HIT-1 can be assessed as a **public-sector pilot platform** for AI-enabled eldercare innovation, rather than merely as a commercial robot.

Public-Sector Evaluation Table

Public-Sector Concern	HIT-1 Relevance	Public-Policy Evaluation Value
Ageing population	Supports long-term care capacity expansion	Helps assess whether technology can support ageing-society care capacity
Workforce shortage	Reduces repetitive caregiver workload	Helps evaluate whether AI and robotics can relieve manpower pressure without replacing human care
Care productivity	Improves workflow efficiency	Supports evaluation of whether care teams can deliver more structured services with limited manpower
Night-shift pressure	Supports 24/7 patrols, bed-exit alerts and abnormal-event reminders	Helps assess whether night-time care visibility and response readiness can be improved
Safety monitoring	Supports fall, bed-exit and abnormal-event alerts	Helps evaluate earlier detection, escalation and incident-review capability
Health-monitoring visibility	Supports vital-sign monitoring, sleep observation and abnormal-condition reminders	Helps assess whether basic care observation can become more visible and reviewable
Data governance	Creates auditable care-operation data	Helps evaluate whether eldercare operations can become more transparent, traceable and accountable
Regulatory readiness	Supports human supervision, audit logs, privacy control and deployment SOPs	Helps assess whether AI-enabled eldercare can be deployed responsibly under institutional governance
Policy pilot	Supports smart eldercare evaluation	Provides a controlled setting for government agencies to observe technical, operational and social impact
Scalability	Tests multi-site deployment potential	Helps determine whether the model can be replicated across different institutions and care environments
Public trust	Supports structured records, family communication and governance transparency	Helps build confidence among families, residents, regulators and care providers

Public-Sector Concern	HIT-1 Relevance	Public-Policy Evaluation Value
Responsible innovation	Positions HIT-1 as care support, not caregiver replacement	Supports a balanced public-sector approach to innovation, safety, ethics and workforce transition

Public-Sector Deployment Logic

For government agencies, the practical value of HIT-1 should be assessed through four layers:

Evaluation Layer	Key Question	Expected Public-Sector Insight
Operational layer	Can HIT-1 support routine patrols, reminders, monitoring visibility and workflow documentation?	Understand whether AI robotics can reduce low-value repetitive workload in eldercare institutions
Workforce layer	Can caregiver time be redirected from repetitive tasks to higher-value human care?	Evaluate whether human-robot collaboration can support workforce sustainability
Governance layer	Can HIT-1 generate logs, audit trails, escalation records and responsibility mapping?	Assess whether AI-enabled eldercare can be made traceable, reviewable and accountable
Policy layer	Can the model be piloted, measured and replicated across multiple institutions?	Determine whether smart eldercare robotics can support scalable public-sector ageing-care strategy

Cautionary Statement

HIT-1 should not be presented to government agencies as a complete solution to ageing population pressure or caregiver shortage.

A more accurate positioning is:

HIT-1 may support government agencies in evaluating how AI-assisted robotics can contribute to eldercare capacity, workflow efficiency, night-shift visibility, care-operation data, auditability and responsible smart eldercare deployment.

Its public-sector value depends on local pilot results, institutional readiness, staff adoption, resident acceptance, privacy controls, governance design and measurable deployment evidence.

Q19. Can HIT-1 support government grants, productivity programmes or pilot funding applications?

Commercial Language

HIT-1 may be relevant for productivity improvement, smart eldercare, care-technology adoption or workflow-redesign programmes, subject to the eligibility criteria and assessment of the relevant agencies.

AJJ may support eldercare institutions by preparing pilot scope definition, workflow-redesign documentation, ROI and productivity justification, KPI measurement framework, implementation timeline and grant-support materials.

Technical and Compliance Language

Funding or grant applications should be supported by evidence-based documentation, including project scope, current workflow baseline, proposed AI-assisted workflow, expected productivity improvement, measurement methodology, data governance plan, training and deployment schedule and post-pilot evaluation framework.

Any grant support should be presented as **subject to agency assessment and approval**, not as a guaranteed outcome.

9. Pilot, Deployment and Scaling

Q20. How should an eldercare institution begin deploying HIT-1?

Commercial Language

An eldercare institution should not start with a large-scale purchase immediately.

The recommended approach is:

Start small, validate clearly, and scale responsibly.

A practical first step may be one nursing home, one selected ward or care zone, one to two HIT-1 units, clearly defined KPIs, a fixed evaluation period, and structured feedback from management, caregivers and residents.

This approach allows the institution to understand the real operational value of HIT-1 before broader deployment. It also reduces implementation risk, improves staff acceptance, supports compliance review and helps management make evidence-based scaling decisions.

HIT-1 should therefore be introduced as a **controlled pilot-to-scale deployment model**, not as an immediate full-site replacement or large-scale automation project.

Technical and Compliance Language

From a technical and compliance perspective, HIT-1 deployment should follow a staged pathway covering **site readiness, pilot deployment, workflow configuration, staff training, performance evaluation, compliance review, ROI review and scaling assessment**.

The key deployment principle is:

No scale-up without operational evidence, compliance readiness, staff adoption and management review.

Deployment Roadmap Table

Deployment Phase	Implementation Focus	Evaluation / Go-No-Go Criteria
Phase 1: Readiness Assessment	Review institution workflow, resident profile, care zones, IT environment, staffing model, privacy requirements and deployment purpose	Confirm whether the site is suitable for pilot deployment and whether risks are manageable
Phase 2: Initial Pilot	Deploy one to two HIT-1 units in one selected ward, floor or care zone	Validate basic patrol, alert, reminder, monitoring-support, interaction and documentation functions in a controlled environment
Phase 3: Workflow Configuration	Configure patrol routes, alert rules, reminder schedule, user roles, response SOPs and reporting format	Confirm whether HIT-1 can fit into the institution's actual care workflow
Phase 4: Staff Training	Train caregivers, supervisors, IT users and managers on system use, alert response, privacy rules and manual fallback procedures	Confirm whether staff can operate the system safely, consistently and responsibly
Phase 5: Performance Evaluation	Measure workload, patrol completion, alert response, documentation quality, staff feedback and resident acceptance	Decide whether operational value is visible and whether risks remain acceptable
Phase 6: Compliance Review	Review PDPA, access control, audit logs, incident SOPs, HSA scope, cybersecurity and data-hosting arrangements	Confirm whether compliance readiness supports continued deployment
Phase 7: ROI and Management Review	Review cost, workload-release value, overtime impact, maintenance cost, service value and management feedback	Decide whether the pilot supports commercial and operational justification
Phase 8: Scaling Assessment	Consider expansion to more wards, more facilities or multi-site deployment	Expansion should be based on operational evidence, compliance readiness, staff adoption and ROI logic

Suggested Pilot KPIs

KPI Area	Suggested Measurement	Purpose
Patrol completion	Number of scheduled patrols completed; missed patrol count; route-completion rate	Assess whether HIT-1 supports routine patrol discipline
Alert response	Alert-to-acknowledgement time; alert-to-response time; escalation completion rate	Assess whether abnormal-event visibility and response readiness improve
Workload release	Repetitive task time reduced; caregiver walking time reduced; routine reminder workload reduced	Assess whether caregiver capacity can be released from low-value repetitive work
Documentation quality	Log completeness, timestamp accuracy, report usability and incident traceability	Assess whether management review and audit readiness improve
Staff acceptance	Training completion rate, active usage rate, staff feedback and resistance points	Assess whether the care team can practically adopt HIT-1
Resident acceptance	Resident interaction rate, refusal rate, comfort level, feedback and complaints	Assess whether deployment is suitable for the resident environment
Technical reliability	Device uptime, connectivity stability, error events, maintenance frequency and response time	Assess whether the system is technically stable enough for continued deployment
Compliance readiness	Access control, audit logs, privacy controls, incident SOPs and data-hosting arrangement	Assess whether the deployment is governance-ready

KPI Area	Suggested Measurement	Purpose
Management value	Supervisor feedback, workflow visibility, service differentiation and operational confidence	Assess whether management sees practical institutional value
Financial logic	Pilot cost, maintenance cost, workload-release value, overtime impact and potential ROI	Assess whether expansion is commercially reasonable

Minimum Pilot Design Requirements

Before starting the pilot, the institution should define:

Pilot Design Item	Minimum Requirement
Pilot site	One nursing home, one ward, one floor or one selected care zone
Pilot scale	Usually one to two HIT-1 units for initial evaluation
Pilot duration	A fixed evaluation period, such as several weeks or a defined number of shifts
Resident scope	Clear selection of suitable residents or care zones
Staff scope	Defined caregivers, supervisors, IT users and management reviewers
Workflow scope	Defined patrol routes, alert rules, reminder schedule and documentation requirements
Data scope	Defined data points, access rights, logs, retention rules and privacy controls
Incident SOP	Clear procedure for alerts, false alerts, missed alerts, abnormal events and system failures
Human fallback	Manual care process must remain available during pilot
Review meeting	Scheduled pilot review involving management, caregivers, technical team and compliance personnel

Scaling Decision Principle

The institution should only consider wider deployment when the pilot shows:

- measurable operational value;
- acceptable technical reliability;
- clear staff adoption;
- reasonable resident acceptance;
- manageable compliance and privacy risk;
- usable audit and documentation records;
- clear maintenance and support process;
- credible ROI or service-value logic.

If these conditions are not met, the deployment should be refined before expansion.

Closing Position

HIT-1 deployment should follow a disciplined pilot-to-scale approach.

A responsible deployment pathway is not:

Buy many robots first and solve the workflow later.

A better pathway is:

Start with a controlled pilot, validate operational value, confirm compliance readiness, train staff, collect evidence, and then scale based on measurable results.

Q21. What KPIs should be used in a HIT-1 pilot?

Commercial Language

A HIT-1 pilot should not only evaluate whether the robot can move, speak or demonstrate functions.

It should evaluate whether HIT-1 actually helps the nursing home solve real operational problems.

Suggested KPIs should cover repetitive workload reduction, night-shift patrol coverage, alert response speed, documentation completeness, caregiver acceptance, resident acceptance, family confidence, system stability, maintenance responsiveness, compliance readiness and financial reasonableness.

The most important point is that KPIs should be **measurable**, **time-bound** and **linked to deployment decisions**.

A practical pilot should therefore define:

- baseline before deployment;
- pilot measurement period;
- target improvement range;
- data source;
- responsible reviewer;
- go / no-go decision criteria.

Technical and Compliance Language

Suggested KPI categories should include both operational and governance indicators. The purpose is not to prove that HIT-1 replaces caregivers, but to evaluate whether HIT-1 can support safer, more visible, more efficient and more auditable care operations.

HIT-1 Pilot KPI Table

KPI Category	Quantitative Indicator	Suggested Pilot Target	Decision Use
Repetitive workload	Time spent on repetitive routine tasks before and after deployment	10%–20% reduction in selected repetitive task time during pilot period	Assess whether HIT-1 can release caregiver time from low-value routine tasks
Night patrol coverage	Patrol frequency, route-completion rate, missed-patrol count	≥90% scheduled patrol route completion; reduction in missed patrols compared with baseline	Assess whether night-shift visibility and patrol discipline improve
Alert response	Time from event detection to human acknowledgement / response	10%–30% reduction in alert-to-acknowledgement time where workflow allows	Assess whether abnormal-event visibility and response readiness improve

KPI Category	Quantitative Indicator	Suggested Pilot Target	Decision Use
Bed-exit / fall-related alert review	Number of alerts, confirmed events, false alerts and missed-event review	100% serious alerts reviewed; false alerts and missed alerts documented	Assess alert reliability and human review process
Documentation completeness	Log completeness, timestamp accuracy, report usability	≥90% completeness for required patrol, alert and response logs	Assess whether documentation supports management review and audit readiness
System uptime	Robot operating time, connectivity status, fault downtime	≥95% pilot-period system availability, subject to site network conditions	Assess whether technical stability supports continued deployment
Fault recovery	Time from fault report to recovery or workaround	Critical fault response within agreed SLA; recovery record completed	Assess maintenance responsiveness and operational continuity
Staff training	Training completion rate among designated users	≥90% of designated caregivers / supervisors trained before active pilot use	Assess whether users are ready to operate HIT-1 safely
Active usage	Actual usage rate against planned use cases	≥80% of planned patrol / reminder / alert workflows used during pilot	Assess whether HIT-1 is practically adopted in daily workflow
Caregiver feedback	Staff satisfaction, usability score, reported workflow burden	Majority positive or neutral feedback; key resistance points documented	Assess staff acceptance and workflow fit
Resident acceptance	Interaction rate, refusal rate, complaints, comfort feedback	No material resident-safety or dignity concerns; refusal and complaint trends monitored	Assess whether deployment is suitable for the resident environment
Family confidence	Family feedback, communication satisfaction, complaint trend	Positive or neutral family feedback where family-facing functions are used	Assess whether HIT-1 supports family communication and trust
Privacy and consent readiness	Consent / notification completion, access-control setup, privacy notices	100% required privacy notices, access permissions and consent / notification processes completed before relevant data use	Assess whether deployment is privacy-ready
Access control	Role-based access, user account control, permission records	100% user accounts assigned to approved roles; no shared generic accounts for sensitive functions	Assess whether data access is controlled
Audit readiness	Access logs, alert logs, maintenance logs and export records	100% key system actions logged and reviewable during pilot period	Assess whether deployment is traceable and defensible
Incident management	False alerts, missed alerts, abnormal incidents, escalation records	100% abnormal incidents reviewed under defined SOP	Assess whether incident response and accountability process works
Cybersecurity readiness	Network access approval, encryption, update control, remote access logging	Required security controls completed before system integration or remote maintenance	Assess whether technical risk is acceptable
Maintenance responsiveness	Maintenance request count, response time, resolution time	Maintenance response within agreed SLA; all interventions logged	Assess vendor support quality
Workload-release value	Estimated hours released from repetitive tasks	Directional evidence of time release, calculated from observed workflow data	Support care-capacity planning without claiming automatic staff reduction

KPI Category	Quantitative Indicator	Suggested Pilot Target	Decision Use
Overtime impact	Change in overtime hours or avoidable after-hours workload	Directional reduction where night-shift workflow permits; no guaranteed target	Assess whether labour-pressure reduction is plausible
Financial reasonableness	Pilot cost, operating cost, maintenance cost, estimated workload-release value	Pilot economics reviewed by management before scale-up	Assess whether expansion is commercially reasonable
Management decision readiness	KPI summary, risk review, compliance review and ROI review	Go / no-go decision supported by documented pilot report	Determine whether to refine, pause or scale deployment

KPI Measurement Principles

Measurement Principle	Requirement
Baseline required	Each KPI should compare pilot results against pre-deployment baseline where possible
Site-specific interpretation	KPI targets should be adjusted based on resident profile, staffing model, care zone and IT environment
Human confirmation	Alert-related KPIs should include human acknowledgement and review, not only system-generated alerts
No overclaiming	KPI improvement should not be described as guaranteed clinical outcome, guaranteed safety result or automatic headcount reduction
Evidence-based scale-up	Wider deployment should only be considered after operational, technical, compliance and financial evidence is reviewed

Closing Position

The purpose of HIT-1 pilot KPIs is not to prove that the robot replaces caregivers.

The purpose is to determine whether HIT-1 can provide measurable support in workload release, night-shift visibility, alert response, documentation quality, staff adoption, resident acceptance, governance readiness and responsible scaling.

10. Stakeholder-Specific Questions

Core Logic

CEO buys the strategy; COO and facility heads make the deployment work.

HIT-1 deployment should not be assessed by one stakeholder alone. A Group CEO focuses on strategy, ROI and scalability. A COO or facility head focuses on whether the system can actually be deployed on site. A Nursing Director focuses on care quality, caregiver workload and resident acceptance. IT and data engineers focus on data flow, interfaces, cybersecurity and auditability. Compliance and DPO teams focus on privacy, regulatory boundaries, accountability and evidence.

The following questions and KPI formulas are intended to guide each stakeholder in making measurable, evidence-based deployment decisions.

Q22. What should a Group CEO or nursing-home operator ask before buying HIT-1?

Commercial Language

A Group CEO or nursing-home operator should not purchase HIT-1 only because the robot looks advanced or impressive.

The real question is whether HIT-1 can create measurable operational value, support the group's smart eldercare strategy, reduce repetitive care workload, improve night-shift visibility, strengthen family confidence, support service differentiation and justify responsible scale-up across multiple facilities.

A Group CEO or operator should ask:

1) Does HIT-1 solve our real manpower pressure?
2) Does it support our long-term smart eldercare strategy?
3) Does it help night-shift operations?
4) Will caregivers actually use it?
5) Will residents accept it?
6) Can it improve family confidence?
7) Can it support service differentiation?
8) Is the ROI realistic?
9) Can it be maintained reliably?
10) Can it be scaled across multiple homes?

The purchase decision should be based on **strategic fit, measurable KPI evidence, ROI logic, compliance readiness and scalability**, not only technology appeal.

Technical and Compliance Language

The CEO and management team should review HIT-1 through a quantified strategic-decision matrix.

CEO Strategic Decision and KPI Matrix

Review Area	CEO Key Question	Quantitative KPI / Calculation	Suggested Pilot Target / Threshold	Decision Use
Strategic fit	Does HIT-1 support the group's eldercare strategy?	Strategic-fit rate = supported strategic objectives ÷ total relevant strategic objectives × 100%	Clear alignment with manpower pressure, smart eldercare, service quality, family trust and brand differentiation	Assess whether HIT-1 fits group-level direction
Manpower pressure	Does HIT-1 reduce repetitive workload?	Repetitive workload reduction = baseline repetitive-task minutes – pilot repetitive-task minutes	10%–20% reduction in selected repetitive tasks during pilot	Assess workload-release value

Review Area	CEO Key Question	Quantitative KPI / Calculation	Suggested Pilot Target / Threshold	Decision Use
Night-shift operations	Does HIT-1 improve night-shift visibility?	Patrol completion rate = completed patrols ÷ scheduled patrols × 100%	≥90% scheduled patrol completion	Assess night-shift visibility and operational discipline
Missed patrol reduction	Does HIT-1 reduce missed routine checks?	Missed patrol reduction = baseline missed patrols − pilot missed patrols	Clear downward trend compared with baseline	Assess whether routine coverage improves
Alert response	Does HIT-1 support faster response?	Alert-to-acknowledgement time = acknowledgement time − alert time	10%–30% reduction where workflow allows	Assess abnormal-event response readiness
Staff adoption	Are caregivers willing and able to use it?	Training completion rate = trained users ÷ designated users × 100%; active usage rate = active users ÷ trained users × 100%	≥90% training completion; ≥70% active usage during pilot	Assess adoption feasibility
Resident acceptance	Are residents comfortable with HIT-1?	Refusal rate = refusal events ÷ interaction opportunities × 100%; complaint count	No material dignity, safety or comfort concerns; refusal trend manageable	Assess resident suitability
Family confidence	Does HIT-1 improve family trust?	Positive / neutral family feedback rate = positive and neutral feedback ÷ total feedback × 100%	Majority positive or neutral feedback where family-facing functions are used	Assess family-facing service value
Documentation value	Does HIT-1 improve operational records?	Log completeness rate = complete logs ÷ required logs × 100%	≥90% completeness for patrol, alert and response logs	Assess audit and management-review value
System stability	Is the system reliable enough for operation?	Uptime = available system time ÷ planned operating time × 100%	≥95% pilot-period availability, subject to site network conditions	Assess technical reliability
Maintenance reliability	Is technical support reliable?	SLA compliance rate = support actions completed within SLA ÷ total support actions × 100%	Critical issues handled within agreed SLA; 100% maintenance actions logged	Assess vendor support quality
ROI reasonableness	Is the investment commercially reasonable?	Annual net quantifiable benefit = annual quantifiable benefit − annual operating cost; payback period = initial investment ÷ annual net quantifiable benefit	Positive directional ROI logic; management review required before scale-up	Assess commercial justification
Compliance readiness	Are privacy, HSA scope, data access and SOP issues addressed?	Compliance checklist completion rate = completed controls ÷ required controls × 100%	100% critical compliance controls completed before scale-up	Assess governance readiness
Multi-site scalability	Can the model expand to other homes?	Replication readiness = workflow readiness + staff readiness + IT readiness + compliance readiness	Expansion only after pilot evidence and support capacity are confirmed	Decide whether to scale

CEO Core Calculation Formulas

Annual Net Quantifiable Benefit = Annual Quantifiable Benefit − Annual Operating Cost

$$\text{Payback Period} = \frac{\text{Initial Investment Cost}}{\text{Annual Net Quantifiable Benefit}}$$

$$\text{Repetitive Workload Reduction Rate} = \frac{\text{Baseline Repetitive} - \text{Task Time} - \text{Pilot Repetitive} - \text{Task Time}}{\text{Baseline Repetitive} - \text{Task Time}} \times 100\%$$

These calculations should be used as **planning and decision-support tools**, not as guaranteed financial results, guaranteed labour reduction or guaranteed clinical outcomes.

CEO Closing Position

The CEO should not only ask:

"How much does one HIT-1 cost?"

The better question is:

"Does HIT-1 create measurable operational value, remain acceptable to staff and residents, support compliance, and justify responsible scale-up?"

Q23. What should a COO, nursing-home administrator or facility head ask before on-site deployment?

Commercial Language

The COO, nursing-home administrator or facility head is responsible for turning the CEO's strategic decision into daily operation.

Their focus is not whether HIT-1 is impressive in theory, but whether it can work inside the actual nursing home environment.

They should ask:

1) Which ward, floor or care zone should start first?
2) Who operates HIT-1 each day?
3) Who receives alerts?
4) Who confirms abnormal events?
5) Who responds on site?
6) How will night-shift workflow change?
7) How will caregivers be trained?
8) What happens if HIT-1 is offline?
9) How will residents and families be informed?
10) Who reviews pilot results and decides whether to scale?

The COO and facility head should focus on **daily workflow, staff execution, SOP readiness, resident acceptance, fault handling and operational continuity**.

Technical and Compliance Language

The COO / facility head should assess HIT-1 through an on-site deployment-execution matrix.

COO / Facility Head On-Site Deployment Matrix

Operational Area	COO / Facility Head Question	Quantitative KPI / Calculation	Suggested Pilot Target / Threshold	Execution Use
Pilot scope	Where should deployment begin?	Pilot coverage rate = selected pilot care zones ÷ total facility care zones × 100%	Start with 1 ward, 1 floor or 1 care zone	Control implementation risk
Device allocation	How many HIT-1 units should be deployed first?	Robot-to-zone ratio = number of HIT-1 units ÷ pilot care zones	1–2 HIT-1 units for initial pilot	Avoid over-deployment before validation
Shift ownership	Who is responsible each shift?	Shift ownership coverage = shifts with assigned owner ÷ total shifts × 100%	100% shifts assigned responsible owner	Prevent unowned operation
Alert receiver assignment	Who receives alerts?	Alert-role assignment rate = assigned alert roles ÷ required alert roles × 100%	100% alert roles assigned before go-live	Prevent unreceived alerts
Response workflow	Who responds and how fast?	Response completion rate = completed responses ÷ valid alerts × 100%	100% serious alerts handled under SOP	Maintain care-response discipline
Patrol route configuration	Are patrol routes configured correctly?	Route completion rate = completed routes ÷ scheduled routes × 100%	≥90% scheduled route completion	Validate patrol operation
Night-shift workflow	Does HIT-1 support night operations?	Night patrol completion rate; night alert review rate; night response time	Reduction in missed night patrols; clearer night-event records	Evaluate night-shift value
Staff training	Are staff ready to use HIT-1?	Training completion rate = trained staff ÷ designated staff × 100%	≥90% before active pilot use	Ensure safe and consistent use
Active staff usage	Are staff actually using the system?	Active usage rate = active users ÷ trained users × 100%	≥70% active usage during pilot	Identify resistance and workflow issues
Resident communication	Are residents informed and comfortable?	Resident notification completion rate; refusal rate; complaint count	No material dignity, safety or comfort concerns	Protect resident acceptance
Family communication	Are families informed where relevant?	Family notification completion rate = notified families ÷ relevant families × 100%	Required notification completed before family-facing functions are used	Support transparency and trust
Manual fallback	What happens when HIT-1 is unavailable?	Fallback SOP completion rate = completed fallback procedures ÷ required fallback procedures × 100%	100% manual fallback procedures defined	Ensure care continuity
Incident review	Are abnormal events reviewed properly?	Incident review rate = reviewed incidents ÷ total abnormal incidents × 100%	100% abnormal incidents reviewed	Support accountability and improvement
Pilot review	Who decides whether to expand?	Pilot report completion rate; review meeting completion rate	Formal pilot review before expansion	Support go / no-go decision

COO / Facility Head Core Calculation Formulas

$$\text{Shift Ownership Coverage} = \frac{\text{Shifts with Assigned Owner}}{\text{Total Shifts}} \times 100\%$$

$$\text{Response Completion Rate} = \frac{\text{Completed Responses}}{\text{Valid Alerts}} \times 100\%$$

$$\text{Fallback SOP Completion Rate} = \frac{\text{Completed Fallback Procedures}}{\text{Required Fallback Procedures}} \times 100\%$$

COO / Facility Head Closing Position

The COO and facility head should not ask only:

"Can HIT-1 run?"

They should ask:

"Can HIT-1 work every day, every shift, with our staff, residents, SOPs, night-shift pressure and site constraints?"

Q24. What should a Nursing Director or Nurse Manager ask before adopting HIT-1?

Commercial Language

The Nursing Director or Nurse Manager will focus on care quality, caregiver workload, resident comfort and nursing-workflow safety.

Their concern is not whether the robot is impressive, but whether HIT-1 supports nursing practice without increasing confusion, alert fatigue or operational burden.

They should ask:

1) Does HIT-1 reduce low-value repetitive nursing-support tasks?
2) Does it make night-shift checking more visible?
3) Are alerts useful or too noisy?
4) Can caregivers respond easily?
5) Does documentation become clearer?
6) Are residents comfortable?
7) Does HIT-1 support, rather than interrupt, care routines?
8) Can staff still use manual procedures if the system fails?

HIT-1 should be introduced as a **nursing-support and workflow-assistance tool**, not as a substitute for professional nursing judgement.

Technical and Compliance Language

Nursing leadership should assess HIT-1 using care-operation KPIs.

Nursing Director Care-Operation KPI Matrix

Nursing Review Area	Nursing Key Question	Quantitative KPI / Calculation	Suggested Pilot Target / Threshold	Nursing Decision Use
Repetitive task burden	Does HIT-1 reduce low-value routine tasks?	Routine task reduction = baseline routine-task minutes − pilot routine-task minutes	10%–20% reduction in selected routine tasks	Assess workload-release value
Patrol discipline	Are patrols completed more consistently?	Patrol completion rate = completed patrols ÷ scheduled patrols × 100%	≥90% scheduled patrol completion	Assess routine care coverage
Missed checks	Are missed checks reduced?	Missed-check reduction = baseline missed checks − pilot missed checks	Clear downward trend compared with baseline	Assess coverage improvement
Night-shift visibility	Is night-shift activity more visible?	Night event log completeness; night response time; night patrol completion	Clear logs for night events and responses	Assess night-shift support value
Alert usefulness	Are alerts clinically and operationally useful?	Useful alert rate = human-confirmed useful alerts ÷ total alerts × 100%	Acceptable useful-alert ratio; false alerts reviewed	Assess alert quality
False alert management	Does the system create alert fatigue?	False alert rate = false alerts ÷ total alerts × 100%	False alert rate should be explainable and decreasing over time	Determine whether thresholds or workflow need adjustment
Missed alert management	Are important events missed?	Missed alert count; missed alert review rate = reviewed missed alerts ÷ total missed alerts × 100%	100% serious missed alerts reviewed	Assess system boundary and workflow gaps
Caregiver response	Can caregivers respond properly?	Response completion rate = completed responses ÷ valid alerts × 100%; average response time	100% serious alerts responded to and recorded	Assess care execution
Documentation quality	Are records clearer and more complete?	Log completeness rate = complete logs ÷ required logs × 100%	≥90% key log completeness	Support nursing review and audit readiness
Resident comfort	Are residents comfortable with HIT-1?	Refusal rate, complaint count, interaction frequency, comfort feedback	No material dignity, safety or comfort concerns	Assess suitability for care environment
Caregiver burden	Does HIT-1 reduce or increase caregiver workload?	Net workload impact = time saved − additional operation time	Net positive or neutral workload impact	Assess whether HIT-1 truly supports staff
Manual fallback	Can care continue if HIT-1 fails?	Manual fallback SOP completion rate = completed fallback SOPs ÷ required fallback SOPs × 100%	100% fallback procedures defined	Ensure care continuity
Nursing training	Do caregivers understand how to use HIT-1 safely?	Nursing training completion rate = trained nursing users ÷ designated nursing users × 100%	≥90% before active pilot use	Ensure safe adoption

Nursing Director Core Calculation Formulas

$$\text{Useful Alert Rate} = \frac{\text{Human–Confirmed Useful Alerts}}{\text{Total Alerts}} \times 100\%$$

$$\text{False Alert Rate} = \frac{\text{False Alerts}}{\text{Total Alerts}} \times 100\%$$

Net Workload Impact = Time Saved − Additional Operating Time

Nursing Director Closing Position

The Nursing Director should not only ask:

"What functions does the robot have?"

The better question is:

"Do these functions reduce care pressure, improve night-shift visibility, strengthen documentation and preserve professional nursing judgement?"

Q25. What should IT and data engineers ask before deploying HIT-1?

Commercial Language

IT and data engineers should ensure that HIT-1 is safe, controlled, traceable, maintainable and auditable before deployment.

They will not only ask whether the robot can connect to the internet. They will ask whether HIT-1 can be integrated into the institution's IT and data environment without weakening data ownership, privacy, cybersecurity or operational continuity.

They should ask:

1) What data is collected?
2) Where is the data stored?
3) Who owns and controls the data?
4) Who can access it?
5) Is access logged and auditable?
6) How are users and devices authenticated?
7) Are APIs documented?
8) Are data schemas clear?
9) Is remote maintenance controlled?
10) What happens if the network fails?

The key principle is:

System administration does not equal data ownership.

Technical and Compliance Language

IT and data engineers should conduct data-engineering due diligence with quantitative controls.

IT / Data Engineering Due-Diligence Matrix

Document / Mechanism	Engineering Purpose	Quantitative KPI / Calculation	Suggested Target / Control Standard
System architecture diagram	Shows robot, edge, cloud, dashboard and integration layers	Architecture coverage rate = documented layers ÷ required layers × 100%	100% documentation of device, edge, cloud, dashboard and integration layers
Data-flow diagram	Shows data collection, transmission, storage, processing and sharing	Data-flow coverage rate = mapped data flows ÷ identified data flows × 100%	100% critical data flows mapped before deployment
Data inventory	Lists HIT-1 data objects	Data classification rate = classified data objects ÷ total data objects × 100%	100% classification of device, alert, resident-related, health-related and audit data
Data ownership model	Defines ownership and control of each data category	Ownership assignment rate = data categories with owner ÷ total data categories × 100%	100% ownership assignment before pilot
Access-control matrix	Defines user roles and permissions	Role coverage rate = assigned roles ÷ required roles × 100%	100% role assignment for caregivers, supervisors, IT, vendors and administrators
Authentication mechanism	Verifies users and devices	Authenticated access rate = authenticated sessions ÷ total sessions × 100%	100% authenticated access for sensitive functions
Authorisation rules	Controls view, acknowledge, edit, export and delete rights	Least-privilege compliance rate = approved permissions ÷ active permissions × 100%	No unnecessary privileged access; shared accounts avoided
API documentation	Supports system integration	API documentation completeness = documented endpoints ÷ active endpoints × 100%	100% endpoint, payload, error-code and version documentation
API reliability	Measures interface stability	API success rate = successful API calls ÷ total API calls × 100%	≥95% API success rate in pilot integration environment
Encryption policy	Protects data in transit and at rest	Encryption coverage rate = encrypted sensitive flows ÷ total sensitive flows × 100%	100% encryption in transit for sensitive data; at-rest encryption where required
Audit-log policy	Records access, alerts, changes and maintenance	Log coverage rate = logged critical actions ÷ total critical actions × 100%	100% logging of critical actions
Data-retention policy	Defines retention, deletion, export and archival rules	Retention-rule coverage = data categories with retention rule ÷ total data categories × 100%	100% retention and deletion rules before production use
Remote-maintenance control	Controls vendor remote access	Remote-session logging rate = logged remote sessions ÷ total remote sessions × 100%	100% remote sessions approved, time-limited and logged
Network resilience	Supports operation during connectivity disruption	Offline fallback availability; synchronisation recovery rate	Local logging and manual fallback available during network interruption
Error handling	Manages technical faults	Error resolution rate = resolved errors ÷ reported errors × 100%	100% critical errors reviewed and tracked to closure
Audit export readiness	Supports review and investigation	Audit export success rate = successful exports ÷ requested exports × 100%	Audit package can be generated for the defined review period

IT / Data Engineering Core Calculation Formulas

$$\text{API Success Rate} = \frac{\text{Successful API Calls}}{\text{Total API Calls}} \times 100\%$$

$$\text{Log Coverage Rate} = \frac{\text{Logged Critical Actions}}{\text{Total Critical Actions}} \times 100\%$$

$$\text{Data Classification Rate} = \frac{\text{Classified Data Objects}}{\text{Total Data Objects}} \times 100\%$$

IT / Data Engineering Closing Position

IT and data engineers should not only ask:

"Can HIT-1 connect?"

They should ask:

"Can HIT-1 connect securely, lawfully, traceably and reliably, while preserving data ownership, access control, auditability and operational continuity?"

Q26. What is the biggest concern for compliance officers or DPOs?

Commercial Language

For compliance officers and DPOs, the biggest concern is not whether HIT-1 has many functions.

The real concerns are:

1) Overclaiming;
2) unclear medical boundaries;
3) unclear HSA notified scope;
4) unclear data ownership;
5) insufficient PDPA / privacy controls;
6) AI outputs without human review;
7) weak audit logs;
8) uncontrolled remote maintenance;
9) unclear responsibility boundaries;
10) insufficient SOPs and incident-response procedures.

HIT-1 should be carefully described as a **care-support platform**, not as a system that replaces licensed caregivers or independently makes medical decisions.

Technical and Compliance Language

Compliance / DPO teams should assess HIT-1 through a quantified compliance-control matrix.

Compliance / DPO Risk and Control Matrix

Compliance Risk	Control Measure	Quantitative KPI / Calculation	Suggested Control Target
Medical-device classification risk	Review intended use, product claims and function scope	Function review rate = reviewed functions ÷ deployed functions × 100%	100% review before pilot or expansion
HSA scope overclaiming	Check Class A notified scope and Class B trigger points	Claim review rate = reviewed public claims ÷ total public claims × 100%	100% public-facing claims reviewed
PDPA / privacy risk	Data minimisation, notice / consent, access control and logging	Privacy-control completion rate = completed privacy controls ÷ required privacy controls × 100%	100% completion before processing resident-related personal data
Data ownership risk	Define data ownership and control	Ownership coverage rate = data categories with defined owner ÷ total data categories × 100%	100% ownership mapping
Access-control risk	Apply role-based and least-privilege access	Privileged-account review rate = reviewed privileged accounts ÷ total privileged accounts × 100%	100% privileged accounts reviewed
AI decision risk	Maintain human-in-the-loop; no autonomous clinical judgement	Human-review coverage rate = AI outputs requiring review ÷ total care-relevant AI outputs × 100%	100% human review for care-relevant AI outputs
Audit-log weakness	Maintain access, alert, change, export and maintenance logs	Critical-action log coverage = logged critical actions ÷ total critical actions × 100%	100% logging for critical actions
Responsibility risk	Define SOP, responsibility matrix and incident records	Responsibility mapping completion = assigned responsibility areas ÷ required responsibility areas × 100%	100% completion before active deployment
Cybersecurity risk	Encryption, permissions, remote access control and vulnerability review	Security-control completion rate = completed security controls ÷ required security controls × 100%	100% critical controls before integration
Remote-maintenance risk	Approve, time-limit and log remote access	Remote-access logging rate = logged remote sessions ÷ total remote sessions × 100%	100% remote sessions approved and logged
Operational risk	Training, manual fallback and maintenance plan	Training completion rate; fallback SOP completion rate	≥90% designated staff trained; 100% fallback SOP defined
Overclaiming risk	Review external communications and evidence boundaries	Marketing-review completion rate = reviewed materials ÷ total marketing materials × 100%	100% review of brochures, sales decks and public statements
Cross-border data risk	Use Singapore hosting option or approved transfer controls	Cross-border transfer review rate = reviewed transfers ÷ total cross-border transfers × 100%	100% review before any cross-border transfer
Incident escalation risk	SOP for false alerts, missed alerts, system failures and data incidents	Incident SOP coverage = defined scenarios ÷ required scenarios × 100%	100% coverage for false alerts, missed alerts, faults and data incidents
Evidence documentation risk	Preserve evidence for review and accountability	Documentation completeness rate = complete required records ÷ total required records × 100%	≥90% required deployment records complete during pilot

Compliance / DPO Core Calculation Formulas

$$\text{Compliance Completion Rate} = \frac{\text{Completed Compliance Controls}}{\text{Required Compliance Controls}} \times 100\%$$

$$\text{Human-Review Coverage Rate} = \frac{\text{AI Outputs Requiring Review}}{\text{Total Care–Relevant AI Outputs}} \times 100\%$$

$$\text{Marketing-Review Completion Rate} = \frac{\text{Reviewed Marketing Materials}}{\text{Total Marketing Materials}} \times 100\%$$

Compliance / DPO Closing Position

Compliance officers and DPOs should not only ask:

"How many functions does HIT-1 have?"

They should ask:

"Are HIT-1's functions, claims, data flows, AI outputs, human supervision, privacy controls, audit logs and responsibility boundaries sufficiently controlled for responsible deployment?"

Governance, Data Protection and Auditability Q&A

11. Why Does HIT-1 Need a Regulated Deployment Framework?

Q27. Why does HIT-1 need a regulated deployment framework?

Commercial Language

HIT-1 is not being deployed in a simple consumer environment. It is intended for institutional eldercare settings involving older residents, care workflows, safety events, personal data, health-related information, video communication and operational accountability.

Therefore, the market will not only ask whether the robot can patrol, talk or detect events. The more important question is whether HIT-1 can be deployed in a **controlled, auditable and regulatorily acceptable manner**.

For eldercare operators, a regulated deployment framework helps transform HIT-1 from a "robot purchase" into a credible institutional infrastructure solution.

Technical and Compliance Language

The regulated deployment framework is designed to address AI governance, PDPA-aligned data protection, auditability, access control, data ownership separation, human-in-the-loop

accountability, system logs and incident traceability, cybersecurity, confidential computing, standardised deployment procedures and evidence readiness for institutional and regulatory review.

Institutional deployment requires more than product functionality. It requires **governance readiness**.

Q28. What is the difference between "selling robots" and "building regulated infrastructure"?

Commercial Language

Selling a robot focuses mainly on product features: movement, speech, patrol, reminders and interaction.

Building regulated infrastructure focuses on long-term institutional trust: data control, audit logs, safety workflows, maintenance accountability, compliance readiness and scalable deployment.

For a nursing home, a robot may be attractive. But an auditable care infrastructure is much more valuable because it can support management review, family confidence, government discussion, insurer engagement and future multi-site expansion.

Technical and Compliance Language

Robot-Selling Logic	Regulated Infrastructure Logic
Focuses on device features	Focuses on controlled deployment
Emphasises demonstrations	Emphasises auditability and evidence
Depends on individual site acceptance	Supports repeatable institutional rollout
Limited compliance visibility	Structured governance, data and SOP control
Product-level value	System-level institutional value

The strategic direction is to move HIT-1 from a product demonstration model toward a regulated deployment infrastructure model.

12. Governance Accountability

Q29. What does "governance-level accountability" mean for HIT-1?

Commercial Language

For institutional buyers, the most serious questions are not only whether the robot has functions. The real questions are:

- Who is responsible if something happens?
- Who owns the data?
- Who can access the data?
- Can the system be audited?
- Can alerts be traced?
- Can AI-supported outputs be reviewed?
- Can the institution defend its deployment process?

This means the commercial success of HIT-1 depends heavily on governance credibility, not only hardware capability.

Technical and Compliance Language

Governance-level accountability includes role-based access control, event logs, response logs, AI-output records, human confirmation records, maintenance logs, incident review procedures, SOP mapping, data protection controls and audit-trail preservation.

The goal is to ensure that when a regulator, government agency, nursing home board, insurer, family member or internal auditor asks "what happened?", the institution can produce reliable evidence.

Q30. How does HIT-1 maintain human accountability in AI-assisted care?

Commercial Language

HIT-1 should not be presented as a robot that makes final care decisions. It should support caregivers by providing alerts, reminders, logs and workflow assistance.

The human caregiver, nursing supervisor and institution remain responsible for care judgement, escalation and response.

This is important for trust, compliance and liability management.

Technical and Compliance Language

Human accountability is maintained through human-in-the-loop design, alert confirmation by caregivers, manual override, escalation SOP, audit logs, role-based responsibility matrix, incident review, no autonomous clinical diagnosis and no autonomous treatment decision.

This ensures that AI supports care but does not replace human judgement.

13. Avoiding Pilot Failure and Building Scalable Deployment

Q31. How does HIT-1 avoid being trapped in "pilot purgatory"?

Commercial Language

Many healthcare technologies succeed in demonstrations but fail to scale because every pilot is customised, undocumented and hard to repeat.

HIT-1 should avoid this by using a standardised deployment model:

1) define the care scenario;
2) define KPIs;

3) define data boundaries;
4) define alert response workflow;
5) define staff training;
6) define audit logs;
7) define post-pilot evaluation;
8) define scale-up conditions.

This allows HIT-1 to move from an "interesting pilot" to a repeatable institutional deployment model.

Technical and Compliance Language

To avoid pilot purgatory, HIT-1 should use a standardised deployment checklist, site-readiness assessment, PDPA data-impact review, AI governance checklist, care workflow mapping, KPI measurement framework, audit-log configuration, incident-response SOP and post-deployment evaluation report.

This converts the pilot from a sales demo into a controlled evidence-generation process.

Q32. What is the governance value of standardised deployment?

Commercial Language

Standardised deployment makes HIT-1 easier to scale.

If every nursing home deployment is handled differently, the results will be hard to compare, hard to audit and hard to repeat.

A standardised model allows AJJ and its partners to tell institutions:

We do not only install a robot. We deploy a controlled care-support system with training, SOPs, KPIs, data governance and auditability.

Technical and Compliance Language

Standardised deployment should include site assessment, network and infrastructure check, privacy and data review, resident and workflow suitability review, staff training, SOP configuration, KPI baseline, audit-log activation, incident-response workflow and post-pilot report.

This supports repeatability, governance consistency and scale-up readiness.

14. Five-Layer Governance Architecture

Q33. What is the five-layer governance architecture for HIT-1?

Commercial Language

The five-layer governance architecture helps explain to government agencies and institutions that HIT-1 is not an uncontrolled AI robot. It is a structured deployment system.

It shows that HIT-1 can be governed from data collection to AI processing, operational use, human supervision and institutional review.

Technical and Compliance Language

Layer	Governance Purpose
Layer 1: Data Collection Layer	Defines what data is collected and under what authority
Layer 2: Data Security Layer	Protects data through encryption, access control and hosting rules
Layer 3: AI Processing Layer	Controls how AI analyses information and produces alerts
Layer 4: Human Oversight Layer	Ensures human confirmation and intervention
Layer 5: Audit and Accountability Layer	Preserves logs, reports and evidence for review

This structure supports explainability, accountability, traceability and responsible deployment.

15. PDPA, Data Protection and Data Governance

Q34. How does HIT-1 address PDPA and personal data protection?

Commercial Language

For nursing homes and government agencies, data protection is a central issue because HIT-1 may interact with elderly residents, caregivers, family members and institutional systems.

The platform should therefore be deployed with clear answers to what personal data is collected, why the data is collected, who controls the data, who can access the data, where the data is stored, how long the data is retained, how data access is audited and how data is deleted or exported.

Technical and Compliance Language

PDPA-aligned deployment should include data minimisation, purpose limitation, consent or institutional authorisation mechanism, role-based access control, encryption in transit and at rest, access logs, data-retention policy, incident-response procedure, remote-access control,

cross-border data-transfer assessment and local hosting or Singapore-based cloud option where appropriate.

Q35. How does HIT-1 separate data ownership from system administration?

Commercial Language

This is one of the most important governance points.

A cloud provider, IT administrator or robot vendor may help operate the system, but that does not mean they own resident data or have unrestricted access to it.

For eldercare institutions, this distinction is critical because resident trust, family confidence and regulatory compliance all depend on clear data control.

Technical and Compliance Language

Role	Governance Boundary
Data Owner	Controls data authorisation and final data rights
Institution Admin	Manages operational access within the care facility
System Vendor	Provides technical support under controlled access
Cloud Provider	Provides infrastructure but should not control raw data
AI Model	Processes only authorised and necessary data
Auditor	Reviews logs and compliance evidence

The key principle is:

System administration does not equal data ownership.

Q36. What data governance questions should an institution ask before deployment?

Commercial Language

Before deploying HIT-1, an institution should ask:

- What data will HIT-1 collect?
- Is the data necessary for the care purpose?
- Who owns the data?
- Who has access?
- Can access be restricted?
- Can access be audited?
- Where is the data stored?
- Is any data transferred across borders?
- How long is data retained?
- How can data be deleted, exported or reviewed?

These questions help the institution avoid future compliance and trust problems.

Technical and Compliance Language

A deployment-ready data governance review should include data inventory, data-flow map, legal basis for collection and use, access-control matrix, data-classification policy, storage and hosting assessment, encryption and key-management policy, retention and deletion policy, data-subject request procedure, vendor-access control and incident-response process.

16. AI Governance and AI Verify

Q37. What is the role of AI governance in HIT-1 deployment?

Commercial Language

AI governance is essential because HIT-1 operates in a sensitive eldercare environment.

Institutional buyers need confidence that AI is not being used in an uncontrolled way. AI should support alerts, workflow assistance and care visibility, but it should not independently make clinical decisions or replace professional judgement.

Technical and Compliance Language

AI governance should cover model purpose definition, data-use boundaries, human oversight, explainability, accuracy monitoring, false-positive and false-negative review, model update control, bias and fairness review where applicable, audit logs and post-deployment monitoring.

The correct position is that AI supports institutional care workflows under human supervision.

Q38. What is the role of AI Verify in the HIT-1 governance model?

Commercial Language

AI Verify can help institutions show that HIT-1 is not being deployed as an uncontrolled AI system. It provides a governance reference point for assessing AI transparency, accountability, explainability, safety and human oversight.

For institutional buyers, this strengthens trust. For government agencies, it creates a more structured basis for evaluation.

Technical and Compliance Language

AI Verify-style governance can support assessment of transparency, explainability, fairness, safety, robustness, accountability, human agency and oversight, data governance, model monitoring and documentation.

HIT-1 should not claim that AI Verify automatically approves or certifies the system unless a formal assessment has been completed.

A safer wording is:

HIT-1 may be assessed against AI Verify-style governance principles as part of responsible AI deployment planning.

Q39. How should AI outputs from HIT-1 be treated?

Commercial Language

AI outputs from HIT-1 should be treated as support signals, not final decisions.

For example, if HIT-1 generates an alert, the alert should support caregiver attention and escalation, but the final response should remain with the nursing staff and institution.

This protects residents, caregivers and the institution.

Technical and Compliance Language

AI outputs should be governed by assistive-output classification, human confirmation, alert escalation workflow, false-alert review, missed-alert review, no autonomous clinical diagnosis, no autonomous treatment decision, audit log preservation and periodic performance review.

This ensures AI is used as a controlled support tool.

17. Confidential Computing and Cybersecurity

Q40. What is confidential computing, and why is it relevant to HIT-1?

Commercial Language

Confidential computing can be explained simply as a way to protect sensitive data even while the system is processing it.

For eldercare institutions, this is important because resident data, care records, video communication and health-related information may be sensitive.

It helps reassure institutions that data security is not only about storage, but also about how data is protected during system use.

Technical and Compliance Language

Confidential computing may support secure execution environments, hardware-based data protection, separation between infrastructure provider and data owner, reduced exposure of raw data, stronger protection during AI processing and improved trust in cloud or hybrid-cloud deployment.

In HIT-1 governance language, this supports the principle that system administrators should not automatically become data owners or unrestricted data viewers.

Q41. What cybersecurity controls should support HIT-1 deployment?

Commercial Language

Cybersecurity is part of institutional trust.

A nursing home should not deploy HIT-1 unless it understands how the system protects resident data, controls access, manages remote support and responds to incidents.

Technical and Compliance Language

Cybersecurity controls should include encryption in transit, encryption at rest, access control, multi-factor authentication where appropriate, remote-maintenance approval process, activity logging, software-update control, vulnerability management, incident-response procedure, backup and recovery process and network segmentation where appropriate.

These controls help reduce unauthorised access, data leakage and operational disruption.

18. Auditability and Evidence Readiness

Q42. What audit trails should HIT-1 generate?

Commercial Language

Audit trails help the institution answer critical questions after an event:

- What did the robot detect?
- When was the alert generated?
- Who received the alert?
- Who responded?
- How long did the response take?
- Was there any system failure?
- Was any data accessed or changed?
- Was remote support involved?

Without audit trails, the institution cannot defend its operational process.

Technical and Compliance Language

HIT-1 should support audit trails for user access, system login, patrol routes, alert generation, caregiver acknowledgement, response timing, incident escalation, remote maintenance, software updates, AI parameter changes, data export and abnormal system events.

This supports institutional review, compliance inspection, internal audit and incident investigation.

Q43. Why is auditability a commercial advantage, not only a compliance requirement?

Commercial Language

Auditability builds trust.

For nursing home operators, auditability helps management understand operations. For families, it improves confidence. For government agencies, it supports responsible evaluation. For insurers and partners, it creates evidence of controlled deployment.

Therefore, auditability is not only defensive. It can become a market differentiator.

Technical and Compliance Language

Auditability supports management review, incident reconstruction, regulatory inspection, insurer discussion, grant reporting, service-quality evaluation, KPI validation and risk governance.

A robot that can perform functions is useful. A platform that can prove what happened is institutionally valuable.

Q44. What cautionary statement should be added for the governance framework?

Commercial Language

The HIT-1 regulated deployment framework should be understood as a governance and deployment-readiness structure. It does not mean that every deployment is automatically approved, risk-free or suitable for every institution.

Each institution should still conduct its own operational, technical, legal, privacy and compliance review.

Technical and Compliance Language

A suitable cautionary statement is:

The HIT-1 regulated deployment framework is intended to support responsible AI governance, data protection, auditability and institutional deployment planning. It does not replace applicable regulatory approvals, institutional compliance review, medical judgement, professional caregiving responsibilities, PDPA obligations or site-specific risk assessment. Actual deployment outcomes depend on the institution's care environment, system configuration, data governance controls, staff training, resident profile, workflow design and ongoing operational discipline.

19. Sales, Installation and After-Sales Service

Section Positioning

HIT-1 should not be treated as a one-time equipment sale.

It should be deployed as a **managed AI-enabled care-support system** involving pre-sales assessment, real-world site evaluation, installation, configuration, training, technical support, maintenance, software updates, remote service control and after-sales service review.

For eldercare institutions, the key question is not only whether HIT-1 can be purchased, but whether it can be installed safely, operated consistently, maintained reliably, supported technically and improved continuously after deployment.

This section should be read together with the real-world deployment principle already reflected in the Hangzhou eldercare-site visit and training materials: the objective is not hardware demonstration alone, but evaluation of HIT-1 within real eldercare environments, care-workflow optimisation, night-shift patrol support, fall-detection workflows, medication reminders, documentation assistance, remote-care coordination and caregiver workload reduction.

Q45. Why should HIT-1 not be sold as a simple product demonstration or casually described as a clinical trial?

Commercial Language

HIT-1 should not be sold merely as a simple product demonstration.

A conventional robot demonstration may show whether the robot can move, speak, display functions or present hardware specifications. However, that is not where the core value of HIT-1 lies.

The commercial value of HIT-1 should be explained through its ability to support **real eldercare operations**, including:

1) care-workflow optimisation;
2) night-shift patrol support;
3) fall-detection workflows;
4) medication reminder support;
5) care-documentation assistance;
6) remote-care coordination;
7) caregiver workload reduction;
8) long-term human-robot care collaboration.

Therefore, the correct sales positioning is not:

“Come and watch the robot perform.”

The better positioning is:

“Evaluate how HIT-1 supports real nursing-home operations, care workflows, caregiver coordination and long-term AI-assisted care deployment.”

HIT-1 should also not be casually described as a "clinical trial" unless the activity is formally designed, approved and governed as clinical research.

Most institutional sales and deployment activities should be described as:

- real-world eldercare site evaluation;
- operational pilot;
- workflow validation;
- deployment-readiness assessment;
- controlled institutional pilot;
- care-operations evaluation.

Technical and Compliance Language

From a sales-compliance perspective, the language used to introduce HIT-1 must be carefully controlled.

Incorrect or Risky Positioning	Preferred Positioning
Product demonstration only	Real-world eldercare site evaluation
Hardware show	AI-enabled care-workflow assessment
Robot performance show	Institutional deployment-readiness review
Clinical trial	Controlled institutional pilot, unless formally approved as clinical research
Medical experiment	Care-operations evaluation, unless formally approved as clinical research
Robot replaces caregivers	Human-supervised care-support platform
Autonomous clinical AI	AI-assisted monitoring and workflow-support system
Guaranteed fall prevention	Fall-detection workflow and alert-support mechanism
Guaranteed manpower reduction	Directional caregiver workload-release assessment
Guaranteed ROI	Pilot-based operational and financial evaluation

Why Simple Demonstration Is Not Enough

Demonstration Focus	Limitation
Robot movement	Does not prove care-workflow integration
Voice interaction	Does not prove caregiver adoption or resident acceptance
Hardware specifications	Does not prove long-duration institutional stability
Single feature display	Does not prove night-shift usefulness or SOP fit
One-time demo	Does not prove multi-shift, multi-resident or multi-zone deployment feasibility

Correct Sales Positioning Statement

HIT-1 should be introduced as an AI-enabled care-support platform for real-world eldercare operations. Its value should be assessed through site evaluation, controlled institutional pilot deployment, care-workflow validation, operational KPI review, human-supervised alert response, documentation quality, system stability and compliance readiness.

Q46. What should an institution clarify before purchasing HIT-1?

Commercial Language

Before purchasing HIT-1, an institution should clarify whether the purchase is intended for demonstration, pilot deployment, single-site use, multi-site expansion or long-term platform development.

The institution should not purchase HIT-1 only based on product appearance or feature lists. It should first confirm:

1) the deployment purpose;
2) the target care zone;
3) the expected workflow value;
4) the responsible operating team;
5) the IT and data environment;
6) privacy and consent requirements;
7) maintenance expectations;
8) training needs;
9) budget and ROI assumptions;
10) whether expansion will depend on pilot evidence.

Technical and Compliance Language

A structured pre-sales review should be completed before purchase.

Pre-Purchase Review Area	Key Question	Quantitative KPI / Calculation	Suggested Control Target
Deployment purpose	Is this for pilot, single-site deployment or multi-site rollout?	Purpose-definition completion = completed purpose items ÷ required purpose items × 100%	100% purpose definition before contract
Site readiness	Is the facility ready for deployment?	Site-readiness score = completed site-readiness items ÷ required items × 100%	≥90% before installation
Workflow fit	Which care workflows will HIT-1 support?	Workflow-mapping rate = mapped workflows ÷ target workflows × 100%	100% target workflows mapped before pilot
IT readiness	Can the site support network, dashboard and system access?	IT-readiness completion = completed IT items ÷ required IT items × 100%	100% critical IT items completed before go-live
Privacy readiness	Are notice, consent and access-control requirements understood?	Privacy-readiness completion = completed privacy controls ÷ required controls × 100%	100% before resident-related data use
Budget readiness	Has the institution reviewed cost and service assumptions?	Budget-review completion = reviewed cost items ÷ total cost items × 100%	100% before purchase approval
Maintenance expectation	Are service response, repair and support expectations defined?	SLA-definition completion = defined SLA items ÷ required SLA items × 100%	100% before purchase contract
Pilot evaluation	Are KPI targets and go / no-go criteria defined?	KPI-definition rate = defined KPIs ÷ required KPIs × 100%	100% before pilot start

Pre-Purchase Closing Position

The correct purchase question is not only:

“What is the price of HIT-1?”

The better question is:

“Is our institution ready to deploy, operate, maintain, govern and evaluate HIT-1 responsibly?”

Q47. What should be included in HIT-1 installation and deployment support?

Commercial Language

HIT-1 installation should not be treated as simple equipment delivery.

It should include site assessment, network preparation, route configuration, sensor calibration, charging-location planning, dashboard setup, user account configuration, test operation and handover documentation.

The installation process should minimise disruption to residents and caregivers.

Technical and Compliance Language

Installation and deployment should follow a controlled checklist.

Installation Area	Required Support	Quantitative KPI / Calculation	Suggested Target
Site survey	Review floor layout, corridors, care zones and operating environment	Site-survey completion = completed survey items ÷ required items × 100%	100% before installation
Network setup	Confirm Wi-Fi / network access, firewall rules and connectivity	Network-readiness rate = completed network items ÷ required network items × 100%	100% before system activation
Charging location	Confirm safe charging area and power access	Charging-readiness completion = completed charging items ÷ required charging items × 100%	100% before go-live
Route configuration	Configure patrol routes and care-zone boundaries	Route-configuration completion = configured routes ÷ planned routes × 100%	100% target routes configured before pilot
Sensor calibration	Calibrate relevant monitoring and navigation sensors	Calibration completion = completed calibration items ÷ required calibration items × 100%	100% before active use
User account setup	Create approved user roles and access rights	Account-readiness rate = approved accounts ÷ required accounts × 100%	100% before go-live
Dashboard setup	Configure dashboard, alert view and reporting view	Dashboard-readiness completion = completed dashboard items ÷ required items × 100%	100% before pilot start
Test operation	Conduct trial patrol, alert test and response simulation	Test-pass rate = passed tests ÷ required tests × 100%	100% critical tests passed
Handover documents	Provide deployment record, configuration record and operating notes	Handover-completion rate = completed handover documents ÷ required documents × 100%	100% before formal handover

Installation Closing Position

HIT-1 installation should be treated as a controlled deployment process, not a simple delivery event.

Q48. What training should be provided before HIT-1 goes live?

Commercial Language

Before HIT-1 goes live, the institution should receive structured training for caregivers, supervisors, IT users, management and maintenance coordinators.

Training should not only teach how to operate the robot. It should also explain:

- how to respond to alerts;
- how to use the dashboard;
- how to handle false alerts;
- how to escalate abnormal incidents;
- how to protect resident privacy;
- how to use manual fallback;
- how to report technical faults;
- what HIT-1 can and cannot do.

Technical and Compliance Language

Training should be documented and measured.

Training Area	Target Users	Quantitative KPI / Calculation	Suggested Target
Basic operation training	Caregivers, supervisors	Training completion rate = trained users ÷ designated users × 100%	≥90% before go-live
Alert response training	Caregivers, supervisors	Alert-training completion = trained alert users ÷ designated alert users × 100%	100% alert-response users trained
Dashboard training	Supervisors, management	Dashboard-training completion = trained dashboard users ÷ designated users × 100%	≥90%
IT support training	IT and technical users	IT-training completion = trained IT users ÷ designated IT users × 100%	100% key IT users trained
Privacy and data training	Caregivers, supervisors, IT users	Privacy-training completion = trained users ÷ users with data access × 100%	100% users with data access trained
Manual fallback training	Caregivers, supervisors	Fallback-training completion = trained users ÷ designated users × 100%	≥90%
Incident escalation training	Caregivers, supervisors, managers	Incident-training completion = trained users ÷ designated incident users × 100%	100% key escalation users trained
Training assessment	All designated users	Pass rate = users passing assessment ÷ users assessed × 100%	≥90% pass rate or retraining required

Training Closing Position

Training should confirm that staff understand not only how to use HIT-1, but also when human judgement, escalation and manual fallback are required.

Q49. What after-sales service and maintenance should be expected?

Commercial Language

After-sales service is essential because HIT-1 is expected to operate in a real eldercare environment.

The institution should expect clear support arrangements covering technical troubleshooting, remote diagnostics, on-site maintenance, spare parts, software updates, performance optimisation, service records and escalation channels.

A responsible after-sales model should answer:

1) who provides support;
2) how support is requested;
3) how quickly issues are acknowledged;
4) how quickly faults are resolved;
5) when on-site support is required;
6) how software updates are controlled;
7) how maintenance logs are kept;
8) how recurring faults are reviewed.

Technical and Compliance Language

After-sales support should be governed by measurable service indicators.

Service Area	Required Support	Quantitative KPI / Calculation	Suggested Service Target
Helpdesk support	Provide clear support contact and ticket process	Ticket acknowledgement rate = acknowledged tickets ÷ total tickets × 100%	100% acknowledgement within agreed SLA
Fault response	Respond to reported faults	Mean time to respond = total response time ÷ number of incidents	Within agreed SLA
Fault recovery	Restore system function or provide workaround	Mean time to recover = total recovery time ÷ number of incidents	Within agreed SLA based on severity
Critical incident handling	Escalate high-risk operational or technical issues	Critical-incident review rate = reviewed critical incidents ÷ total critical incidents × 100%	100% reviewed
Remote diagnosis	Conduct approved remote diagnostic checks	Remote-session logging rate = logged remote sessions ÷ total remote sessions × 100%	100% approved and logged
On-site maintenance	Provide physical inspection or repair when required	On-site completion rate = completed on-site visits ÷ required on-site visits × 100%	100% required visits completed
Spare parts support	Maintain availability of necessary parts	Spare-part fulfilment rate = fulfilled part requests ÷ total part requests × 100%	Target to be defined in service agreement

Service Area	Required Support	Quantitative KPI / Calculation	Suggested Service Target
Preventive maintenance	Perform periodic inspection and optimisation	Preventive-maintenance completion = completed PM activities ÷ scheduled PM activities × 100%	≥90% scheduled PM completed
Service records	Maintain repair, update and maintenance logs	Service-record completeness = complete service records ÷ required records × 100%	≥90% complete; 100% for critical incidents
Customer review	Conduct service review with institution	Service-review completion = completed reviews ÷ scheduled reviews × 100%	Regular review during pilot and post-deployment

After-Sales Closing Position

After-sales service should not be treated as optional support. It is part of HIT-1's institutional deployment model.

Q50. How should software updates, remote maintenance and service records be managed?

Commercial Language

Software updates and remote maintenance should be controlled because HIT-1 operates in a sensitive eldercare environment.

Updates should not be applied casually. Remote access should not be open-ended. Service records should not be informal.

The institution should know:

- what is being updated;
- why the update is needed;
- who approved it;
- when it was applied;
- whether it affects AI alerts, workflows or data;
- whether rollback is possible;
- whether remote access was logged;
- whether service actions are auditable.

Technical and Compliance Language

Software update and remote-maintenance controls should be documented.

Control Area	Required Control	Quantitative KPI / Calculation	Suggested Control Target
Version control	Record software, model and configuration versions	Version-record completeness = recorded versions ÷ active versions × 100%	100% recorded
Update approval	Require approval before material updates	Update-approval rate = approved updates ÷ total updates × 100%	100% material updates approved
Update testing	Test updates before active use	Update-test pass rate = passed tests ÷ required tests × 100%	100% critical tests passed
Rollback readiness	Maintain rollback process where applicable	Rollback-readiness completion = completed rollback items ÷ required items × 100%	100% for material updates

Control Area	Required Control	Quantitative KPI / Calculation	Suggested Control Target
AI parameter change	Record AI threshold or parameter changes	AI-change log coverage = logged AI changes ÷ total AI changes × 100%	100% logged
Remote access approval	Approve remote sessions before access	Remote-access approval rate = approved sessions ÷ total sessions × 100%	100% approved
Remote access logging	Log time, user, purpose and action	Remote-access log coverage = logged sessions ÷ total sessions × 100%	100% logged
Service record	Record faults, fixes, updates and maintenance	Service-record completeness = complete records ÷ required records × 100%	≥90%; 100% for critical events
Post-update monitoring	Monitor system performance after update	Post-update review completion = completed reviews ÷ required reviews × 100%	100% for material updates
Change communication	Inform relevant users of material changes	User-notification completion = notified users ÷ affected users × 100%	100% affected key users notified

Update and Remote-Service Closing Position

Software updates and remote maintenance should be treated as controlled technical and compliance events, not informal service actions.

Q51. How should service quality be measured after deployment?

Commercial Language

After deployment, the institution should not judge service quality only by whether HIT-1 is still running.

Service quality should be measured by whether the system remains useful, reliable, maintainable, accepted by staff, safe for residents and aligned with the institution's care workflow.

Technical and Compliance Language

A post-deployment service review should include operational, technical and support indicators.

Service Quality Area	Quantitative KPI / Calculation	Suggested Target / Review Standard
System availability	Uptime = available system time ÷ planned operating time × 100%	≥95%, subject to site network conditions
Ticket response	Response SLA compliance = tickets responded within SLA ÷ total tickets × 100%	Target to be defined in service agreement
Fault recovery	Recovery SLA compliance = faults recovered within SLA ÷ total faults × 100%	Target based on severity
Repeated faults	Repeat-fault rate = repeated faults ÷ total faults × 100%	Should decline over time
Preventive maintenance	PM completion rate = completed PM ÷ scheduled PM × 100%	≥90%
User satisfaction	Staff satisfaction score or positive / neutral feedback rate	Majority positive or neutral
Workflow usefulness	Workflow usage rate = active workflows used ÷ configured workflows × 100%	≥80% during stable deployment

Service Quality Area	Quantitative KPI / Calculation	Suggested Target / Review Standard
Documentation completeness	Complete service records ÷ required service records × 100%	≥90%; 100% for critical incidents
Update quality	Post-update incident count; update-test pass rate	No material unresolved post-update issues
Management review	Completed service-review meetings ÷ scheduled review meetings × 100%	Regular review during pilot and after deployment

Service Quality Closing Position

Service quality should be measured by reliability, responsiveness, documentation, user adoption, workflow value and continuous improvement.

Q52. Why should HIT-1 not be priced or sold only by unit price?

Commercial Language

HIT-1 should not be priced or sold only by the unit price of one robot.

A single unit price may describe the cost of the hardware, but it does not reflect the full deployment value, service obligations or operational cost of HIT-1 in an eldercare institution.

HIT-1 is not merely a standalone robot. It is part of an AI-enabled care operations system involving site assessment, installation, workflow configuration, user training, technical support, software updates, remote maintenance, data governance, audit logs and after-sales service.

Therefore, an institution should not only ask:

“How much is one HIT-1?”

It should ask:

“What is the full contract-period cost, what services are included, what is excluded, and what level of support is guaranteed?”

The correct commercial approach is to disclose both:

1) **Unit Price** — the price of one HIT-1 device; and
2) **TCV / Total Contract Value** — the total committed contract value over the agreed contract period.

Technical and Compliance Language

A unit price alone is insufficient because HIT-1 deployment may involve several cost and service components beyond the device itself.

Why Unit Price Alone Is Insufficient	Explanation
Installation is required	HIT-1 may require site assessment, route configuration, charging-location planning, network setup and system activation
Training is required	Caregivers, supervisors, IT users and managers need training before safe operational use
Workflow configuration is required	Patrol routes, alert rules, response SOPs and documentation workflows must be configured
Maintenance is required	Long-term operation requires technical support, troubleshooting, spare parts and preventive maintenance
Software and AI updates may be required	Version control, software patches, AI parameter optimisation and update approval may be needed
Data and audit controls are required	Access control, data flow, audit logs, service logs and privacy controls must be managed
Remote support may be required	Remote diagnosis, remote maintenance and service access must be controlled and logged
System integration may be required	API connection, dashboard setup, data export or integration with existing systems may involve additional scope
SLA may differ by service level	Standard support, premium support, emergency support and response-time commitments may carry different costs
Multi-year cost matters	CFOs and procurement committees need to understand annual and total contract-period financial exposure

TCV / Total Contract Value

For procurement, finance and management review, HIT-1 pricing should clearly distinguish between:

1) **Unit Price** — the price of one HIT-1 unit;
2) **Annual TCV** — the total committed charges for each contract year;
3) **Total TCV** — the total value of all committed charges over the full contract period;

Excluded or Optional Items — items not included in the quotation or contract and requiring separate quotation or approval.

TCV Calculation

$$TCV_{Y_n} = Device\ Purchase\ /\ Lease\ Fee_{Y_n} + Installation\ Fee_{Y_n} + Training\ Fee_{Y_n} +$$

$$\text{Maintenance / Service Fee}_{Y_n} + Software\ /\ Cloud\ Fee_{Y_n} + Integration\ Fee_{Y_n} +$$

$$Other\ Contracted\ Charges_{Y_n}$$

$$\text{Total TCV} = \sum_{n=1}^{N} TCV_{Y_n}$$

Where:

- Y_n = contract year n;
- N = total number of contract years;

- TCV_{y_n} = total contract value for year n;
- Total TCV = total contract value over the full contract period.

Closing Position

HIT-1 pricing should be **unit-price transparent but TCV-based**.

The unit price tells the institution the cost of the device.
TCV tells the institution the full commercial commitment required to deploy, operate, support and maintain HIT-1 responsibly.

20. HIT-1 Platform Connectivity, Peripheral Integration and System Integration

Q53. Does HIT-1 support external device connectivity and system integration?

Commercial Language

Yes. HIT-1 should not be understood as a single isolated robot. It should be understood as an **AI-assisted eldercare operations platform** that can be deployed in eldercare institutional settings.

Depending on the specific deployment scenario, institutional requirements and project configuration, HIT-1 may support controlled connectivity with relevant health-measurement devices, environmental-sensing devices, safety-sensing devices, care-workflow systems and institutional back-end platforms. This may help eldercare institutions enhance health observation, night-time safety management, abnormal-event alerting, care documentation, family communication and operational review.

For example, under appropriate configuration, HIT-1 may support connectivity or data collaboration with relevant devices or systems such as blood-pressure devices, blood-oxygen devices, thermometers, blood-glucose devices, radar-sensing devices, environmental-sensing devices and institutional data dashboards.

Its core value is not simply "connecting more devices". Rather, its value lies in helping eldercare institutions establish a more continuous, visible, recordable, reviewable and traceable care-operation workflow.

Technical and Compliance Language

HIT-1's device connectivity and system-integration capabilities should be configured and reviewed based on the specific deployment scenario, device type, data type, network environment, institutional workflow and applicable regulatory requirements.

Different devices and systems may adopt different controlled connectivity methods, such as **Bluetooth, BLE, Ethernet / RJ45, wired or wireless networks, gateways, middleware**, or other institution-approved system interfaces. Such connectivity may be used to support health-status

visualisation, sleep and night-time status observation, bed-exit and fall-related alerts, care-task records, abnormal-event review and operational management support.

The public Q&A does not disclose specific **API endpoints, payload fields, security credentials, port configurations, complete network topology or non-public technical parameters**. Detailed connectivity methods, device protocols, interface specifications, data fields, system configurations and acceptance criteria should be provided only in confidential technical appendices, project-specific SOWs, system integration documents or authorised technical review materials to authorised IT, data-engineering, compliance or project implementation teams.

HIT-1 External Device Connectivity and System Integration Overview

Device / System Category	Possible Connectivity Method	Main Purpose	Public Disclosure Boundary
Blood-pressure devices	Bluetooth / BLE / Gateway	Blood-pressure data recording, trend observation and caregiver review	Does not constitute automated diagnosis or treatment decision-making
Blood-oxygen devices	Bluetooth / BLE / Gateway	SpO_2 data observation and abnormal-status alert support	For care observation and human review support only
Thermometers	Bluetooth / BLE / Gateway	Body-temperature recording, trend observation and abnormal-status alert support	Does not constitute clinical judgement
Blood-glucose devices	Bluetooth / BLE / Gateway	Blood-glucose data recording, trend observation and chronic-condition management support	Does not automatically interpret disease status or adjust medication
Radar / safety-sensing devices	Ethernet / RJ45 / Gateway	Bed-exit observation, activity-status observation and night-time safety alerts	Does not guarantee fall prevention and does not replace on-site caregiver judgement
Environmental-sensing devices	Ethernet / RJ45 / Wireless / Gateway	Hazardous gas, environmental status and safety-status observation	For safety alerting and operational support only
Institutional back-end systems	Institution-approved Interface / Middleware	Care records, task management, operational dashboards and management review	Subject to PDPA, authorisation management and institutional SOPs
Family communication systems	Controlled Communication Interface	Family communication, remote interaction and information-transmission support	Subject to appropriate authorisation, consent and privacy controls
Maintenance / service systems	Controlled Service Access	Device maintenance, remote support, service logs and system-status review	Subject to authorised access, log retention and audit records

Confidential Technical Materials Not Disclosed as Part of the Public Q&A

To protect the Company's technical materials, customer system security, data security and cybersecurity, the public Q&A does not disclose the following detailed engineering implementation materials. Such materials should be managed separately as confidential technical appendices, project-specific SOWs, system integration documents, network configuration files, testing and acceptance materials or authorised technical review documents.

Content Category	Public Disclosure Status	Document Management Method
API endpoint	Not disclosed	Provided only in confidential technical appendices, project-specific SOWs or authorised technical review materials
Payload fields	Not disclosed	Provided only to authorised IT / data-engineering / project implementation teams
Port numbers	Not disclosed	Managed only in project network configuration or system integration documents
IP / network topology	Not disclosed	Managed only in project network architecture, security assessment or on-site deployment documents
Security credentials	Not disclosed	Managed strictly under authorised access, credential management and information-security procedures
Device protocol details	Not disclosed	Managed only in device integration, testing and acceptance materials
Data mapping	Not disclosed	Managed only in system integration, data-governance and authorised technical review materials
Acceptance test cases	Not disclosed	Managed only in project acceptance, testing reports or implementation documents
Vendor-specific integration details	Not disclosed	Managed only in vendor technical materials, project implementation documents or under confidentiality arrangements

Public Disclosure Boundary

The above content is only a **capability-level connectivity overview**, intended to help eldercare institutions, procurement teams, technical personnel and compliance personnel understand HIT-1's platform connectivity capability and compliance boundaries.

Detailed materials relating to specific interfaces, device protocols, API endpoints, payload fields, port configurations, system architecture, network topology, data fields, acceptance criteria and security controls should be managed separately as confidential technical appendices, project-specific SOWs, system integration documents or authorised technical review materials, and are not disclosed as part of this public Q&A.

Accordingly, HIT-1's external device connectivity and system-integration capabilities should be understood as controlled, configurable, reviewable and authorisation-based project implementation capabilities, rather than unrestricted open-interface capabilities or publicly disclosed complete engineering specifications.

Q54. How should HIT-1's connection with blood pressure, blood oxygen, body temperature and blood glucose devices be understood?

Commercial Language

Under appropriate deployment configuration, HIT-1 may support connectivity or data coordination with health-measurement devices such as blood pressure monitors, blood oxygen devices, thermometers and blood glucose meters.

The commercial value of such connectivity is to help eldercare institutions more conveniently record, view and review residents' relevant health status, including blood pressure, blood

oxygen, body temperature and blood glucose data. This may support caregivers in daily observation, trend review and necessary care escalation.

This capability is particularly relevant to eldercare institutions because changes in residents' health status, chronic-condition management, night-time abnormalities and care review are practical operational pain points.

Technical and Compliance Language

Blood pressure, blood oxygen, body temperature and blood glucose data are health-related data. HIT-1's connection, recording, display, trend observation or alerting in relation to such data should be understood as **care observation, health-status visualisation, trend review and human caregiver support**, not automated medical judgement.

HIT-1 should not be represented as autonomously diagnosing disease, automatically interpreting medical conditions, adjusting medication, determining treatment plans or replacing doctors, nurses or other licensed professionals.

If any future use involves diagnosis, treatment decision-making, active clinical risk assessment, automated triage, regulated EMR integration or higher-level AI medical use, further review should be conducted based on the specific intended use, data type, clinical impact and applicable regulatory requirements.

Q55. Does HIT-1 support radar, environmental sensing or visual-sensing devices?

Commercial Language

Subject to specific deployment requirements, HIT-1 may support controlled connectivity with radar, environmental sensing or other safety-monitoring devices. These capabilities may support night-time safety management, bed-exit alerts, activity observation, abnormal-event reminders and caregiver review.

The focus is not the sensor device itself, but the ability to help eldercare institutions reduce patrol blind spots, improve continuity of observation, and strengthen abnormal-event detection and review.

For scenarios such as night-shift manpower shortage, residents' night-time bed-exit events, fall-related risks and high-risk area management, such connectivity may become an important part of HIT-1's platform value.

Technical and Compliance Language

Whether radar, environmental sensing or visual-sensing devices are included in the HIT-1 platform should depend on the specific deployment configuration, method of data collection, whether personal identification is involved, whether raw data is stored, whether the data is linked to care records, and whether AI analysis or institutional management review is used.

Such data use should comply with data minimisation, access control, authorisation management, log retention, privacy protection and applicable PDPA requirements. If images, videos, personal identity, health status or sensitive data are involved, stricter data-protection and institutional compliance review should be conducted.

HIT-1 may support safety alerting and care escalation, but should not be promoted as a guarantee of fall prevention, accident prevention, automated clinical triage or replacement of caregiver judgement on site.

Q56. Is HIT-1's device connectivity part of its core platform value?

Commercial Language

Yes. HIT-1's platform value does not lie only in the humanoid robotic front-end. It lies in its integrated ability to support **device connectivity, health observation, night-time safety, abnormal-event alerting, care records, human review and audit traceability**.

Through appropriate device connection and system coordination, HIT-1 may help eldercare institutions establish a more visible, recordable and reviewable care-operation process covering health observation, sleep and night-time status observation, bed-exit and fall-related alerts, care-task records, abnormal-event handling, management review and audit traceability.

This platform capability is one of the important ways in which HIT-1 differs from ordinary demonstration-type robots or single-function hardware devices.

Technical and Compliance Language

HIT-1's device connectivity should be understood as a controlled, configurable and reviewable platform capability. Its technical value lies in supporting a closed loop from device data capture, data connection, status visualisation, abnormal-event alerting, human acknowledgement, care response, record retention and management review to audit traceability.

This capability should not be understood as automated diagnosis, automated treatment, automated clinical judgement or unrestricted data processing. All related deployments should be reviewed based on institutional scenario, device type, data type, cybersecurity, PDPA, HSA intended-use scope and internal governance requirements.

Q57. Why does the public Q&A not disclose full technical connection parameters?

Commercial Language

Because HIT-1's full technical connection parameters are project implementation and system-security materials, and are not suitable for public disclosure.

The purpose of the public Q&A is to help government agencies, eldercare institutions, procurement committees, compliance officers, investors and other stakeholders understand HIT-1's platform capabilities, commercial value and governance boundaries. It is not intended to

disclose full interface paths, device protocols, data fields, network configurations or system-security details.

This approach supports public transparency while protecting system security and customer information.

Technical and Compliance Language

Specific API endpoints, payload fields, security credentials, device protocols, port configurations, system architecture, network topology, testing items and acceptance criteria are technical implementation materials and potentially sensitive information.

Therefore, the public Q&A discloses only capability-level descriptions. Detailed materials relating to interfaces, device protocols, system architecture, network configuration, data fields, acceptance criteria and security controls should be managed separately as confidential technical appendices, project-specific SOWs, system integration documents or authorised technical review materials. Such materials should be provided only to authorised IT, data-engineering, compliance and project implementation teams, and are not disclosed as part of this public Q&A.

This arrangement helps balance public disclosure by a listed company with information security, data protection and cybersecurity governance.

Chapter Closing Statement

HIT-1's device connectivity and system-integration capability should be understood as part of its AI-assisted eldercare operations platform. The public Q&A may explain its capability to support health observation, sleep and night-time status observation, bed-exit and fall-related alerts, care records, human review, operational management and audit traceability. Specific connection methods, interface specifications, device protocols, network configuration and system architecture should be separately confirmed in confidential technical materials according to project requirements.