

マレーシア国  
AIシステム開発ラボトリ協力事業  
長期調査員報告書

1994年8月

国際協力事業団

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マレーシア国  
A I システム開発ラボラトリ協力事業  
長期調査員報告書

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## 序 文

マレーシア国は「第2次長期総合計画」(OPP2,1991-2000)及び「ビジョン2020」を発表し、2020年までに先進国化するための施策として、科学技術・研究開発の促進を主要政策の一つに掲げている。このような情勢のなかで、産業の拡大、高付加価値化を図り、高度情報化社会を実現するため、マレーシア国の重点項目である「情報技術」の中核と位置付けられるAI技術によるエキスパート・システムの開発・普及を図るべく、AI技術で先進国な技術を有し、産業界での実績を持つ、我が国に対し、この分野における技術移転を要請してきた。

この要請を受けて、我が国政府は、国際協力事業団(JICA)を通じて1994年3月に事前調査団を派遣し、プロジェクトによる要請の背景、位置付け、実施体制、協力の基本事項等の調査を実施したが、さらに調査が必要な項目について、1994年7月13日から7月30日まで財団法人国際情報化協力センター研修部 津田部長を団長とする長期調査員を派遣し、詳細な調査を行った。今回は、特に機材計画について詳細な調査を実施し、マレーシア国側関係機関と確認・合意できた事項について議事録(Minutes of Discussions)にとりまとめ、署名・交換を行った。

本報告書は、同調査員の調査結果をとりまとめたものである。

ここに、本調査員の派遣に関し、ご協力いただいた日本・マレーシア両国の関係各位に対し深甚の謝意を表するとともに、あわせて今後のご支援をお願いする次第である。

1994年8月

国際協力事業団

鉱工業開発協力部

部長 柿沼宇佐



議事録署名・交換



SIRIM 長官表敬



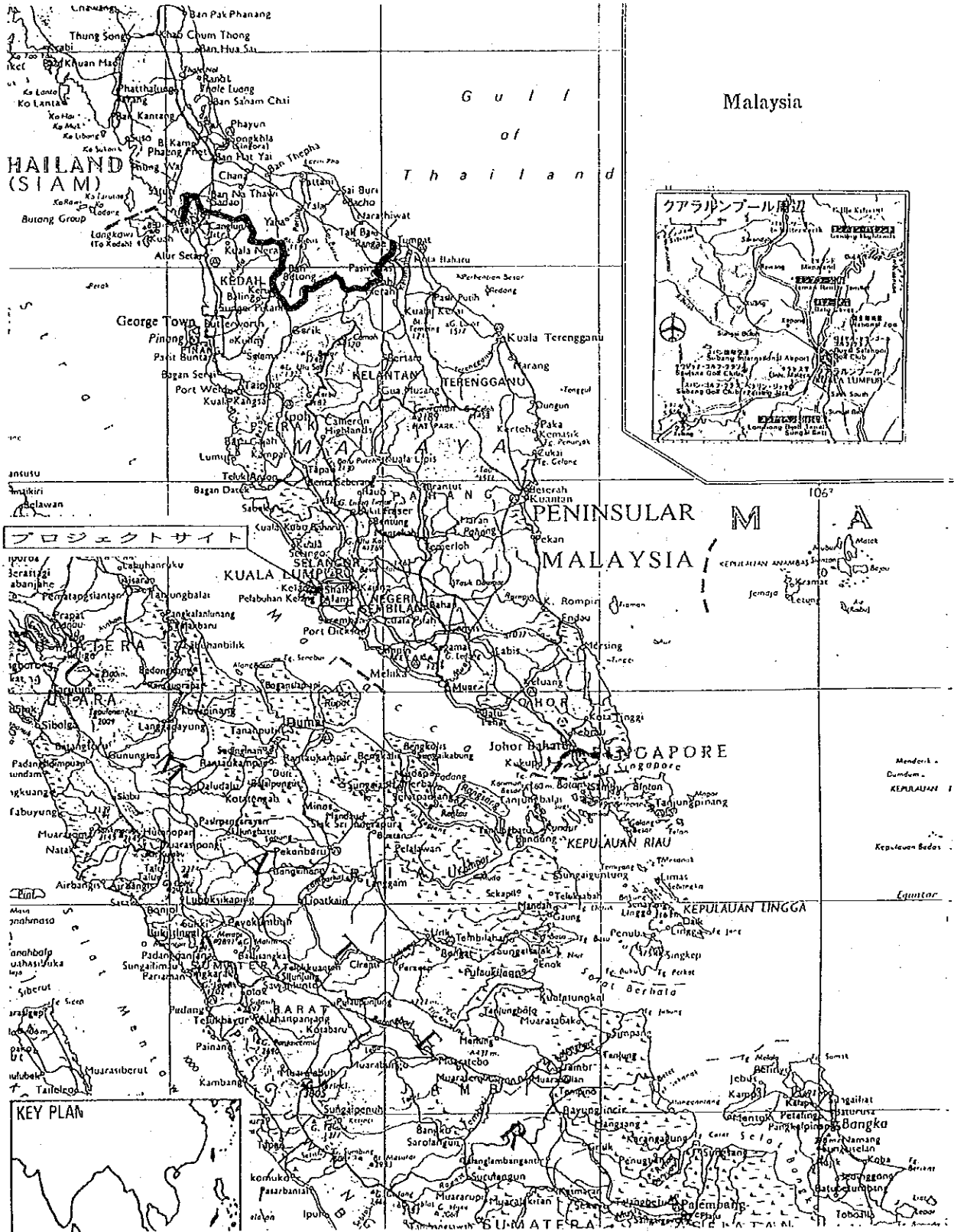
MOSTE 局長との協議



SIRIM との協議



# プロジェクトサイト位置図



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プロジェクトサイト位置図

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## 1. 調査結果の要約

日本政府は、マレーシア国政府からA Iシステム開発ラボラトリ協力事業に係るプロジェクト方式技術協力の要請を受けて、事前調査時に調査した各項目で、さらに詳細な調査が必要な機材計画等について調査するために、JICAを通じて長期調査員を1994年7月13日から7月30日まで現地に派遣した。

調査結果を要約すると、概ね以下の通りである。

### (要請の背景)

マレーシア国において1991年から2000年までの「第2次長期総合計画」(OPP2)が策定され、それに基づく「第6次マレーシア計画」(6MP=91年~95年)が実施されている。同計画は、主要施策の一つに科学技術・研究開発を掲げ、経済の質的向上、経済構造の変革による経済の高付加価値化を進め、2020年までに先進国化するため、「ビジョン2020」構想によって高度情報化社会の実現を目指している。

マレーシア国は、高度情報化社会を達成するために「情報技術」の中核として位置付けられるA I技術によりエキスパート・システムの開発・普及を図るべく、1993年12月に我が国に対して要請してきた。

### (要請の内容)

本要請は、マレーシア国の情報処理分野を所管している科学技術環境省(MOSTE)を総括機関、同省に所属する標準工業研究所(SIRIM)を実施機関とし、SIRIMにA Iシステム開発ラボラトリを設置することにより、A Iをベースとしたエキスパート・システムの開発と普及により、マレーシアの情報化推進を図るものである。

### (調査結果)

(1) 本プロジェクトの技術移転に必要な主要機材の名称、仕様、数量等の確認並びに技術移転との関連性の確認、(2) プロジェクトサイトの基盤整備状況の確認、(3) 暫定実施計画(TSI)の策定、年間計画の策定、(4) マレーシア側カウンターパート(C/P)・スタッフの配置、暫定予算の確認、(5) プロトタイプシステムの開発内容の確認等の調査を実施し、概ね妥当である、との結論に達した。

(今後の進め方)

今回の調査において、本プロジェクトの技術移転に必要な詳細について協議、確認されたが、さらに調査が必要な内容、課題については、JICAマレーシア事務所を通じて確認するとともに、今後予定されている実施協議調査団派遣に向けて準備を進める必要がある。

## 2. 長期調査員派遣

### 2-1 調査員派遣の経緯と目的

マレーシア国において、1991年から2000年までの「第2次長期総合計画」(OPP2)が策定され、それに基づく「第6次マレーシア計画」(6MP=91年~95年)が実施されている。同計画は、主要施策の一つに科学技術・研究開発を掲げ、経済の質的向上、経済構造の変革による経済の高付加価値化を進め、2020年までに先進国化するため、「ビジョン2020」構想によって高度情報化社会の実現を目指している。

マレーシア国は、高度情報化社会を達成するために「情報技術」の中核と位置付けられるAI技術によりエキスパート・システムの開発・普及を図るべく、1993年12月に我が国に対して要請してきた。

この要請を受けて、我が国政府は、国際協力事業団(JICA)を通じて1994年3月に事前調査団を派遣し、プロジェクトによる要請の背景、位置付け、実施体制、協力の基本事項等の調査を実施したが、さらに調査が必要な項目について、1994年7月13日から7月30日まで財団法人国際情報化協力センター研修部 津田部長を団長とする長期調査員を派遣し、詳細な調査を行った。今回は、特に機材計画についての詳細な調査を実施し、マレーシア国側関係機関と確認・合意できた事項について議事録(Minutes of Discussions)にとりまとめ、署名・交換を行った。

### 2-2 調査員の構成

担当分野	氏名	所 属
機材計画(団長)	津田 衛	財団法人 国際情報化協力センター研修部 部長
機 材 計 画	三宅 仁	長岡技術科学大学 体育保健センター助教授 医学博士
技術協力計画	久野 量一	財団法人 国際情報化協力センター振興部調査課

2-3 調査日程

派遣期間 1994年7月13日～7月30日

NO	月	日	曜日	行程	調査内容
1	7	13	水	成田 → クアラルンプール (JL-723)	移動
2		14	木		JICA事務所打合せ、日本大使館表敬
3		15	金		EPU表敬、打合せ
4		16	土		市場調査 (現地調達資料収集)
5		17	日		資料整理
6		18	月		Dr.カルディンとの協議
7		19	火		SIRIMとの協議 (マレーシア側プレゼンテーション)、 ラボラトリ予定場所視察
8		20	水		SIRIMとの協議、クアラルンプール総合病院視察
9		21	木		SIRIMとの協議、タジュディン長官表敬
10		22	金		SIRIMとの協議、ウスラ・タンピ社、プロトン社視察
11		23	土		議事録準備
12		24	日		議事録準備
13		25	月		SIRIMとの協議、MOSTEハムザ局長表敬、打合せ
14		26	火		SIRIMとの議事録協議
15		27	水		SIRIMとの議事録協議、マラヤ大学打合せ
16		28	木		議事録最終レビュー
17		29	金	クアラルンプール → 成田 (L-724)	ミニッツ署名 JICA事務所報告、大使館報告 移動
18		30	土		成田着

## 2-4 主要面談者リスト

### (1) マレーシア国側

#### 1) 経済企画庁 (Economic Planning Unit, EPU)

Ms. Harvindar Kaur Principal Assistant Director

#### 2) 科学技術環境省 (Ministry of Science, Technology and Environment, MOSTE)

Dr. Hamza Kassim Director of Science and Technology Div.

#### 3) 標準工業研究所 (The Standards and Industrial Research Institute of Malaysia, SIRIM)

Dato' Dr. Ahmad Tjiddin Ali Director of General

Hj. Abdul Aziz B. Abudul Manan Deputy Director General & Technology  
Development Div.

Dr. Chong Chok Ngee Director, Research & Technology Development Div.

Mr. A. Aziz Mat Deputy Director, Corporate Service Div.

Mr. Asmadi Md Said Head, Advanced Manufacturing Technology Centre  
(AMTC)

Mr. Raja Muda Raja Ngah Research Manager, AMTC

その他

#### 4) マイクロエレクトロニクスシステム研究所 (Malaysia Institute of Microelectronics System, MIMOS)

Dr. Zulkifli Abdul Kadir Director, Industrial Technology Div.

その他

#### 5) マラヤ大学

Dato' Dr. Hj Abdullah Samusi Ahmad Vice Chancellor

Dato' Dr. Ahmad Nawawi Deputy Vice Chancellor

Prof. Dato' Dr. Khairuddin Yusof Professor/Head of Social Obstetrics &  
Gynaecology, Faculty of Medicine

Dr. C. T. Chua Associate Professor/Deputy Dean, Faculty of Medicine

Prof. Ghauth Associate Dean, Faculty of Engineering

Dr. Awang Bono Lecturer, Faculty of Engineering

### (2) 日本側

#### 1) 在マレーシア日本国大使館

藤原 豊 二等書記官

神原 こうじ 二等書記官

2) JICAマレーシア事務所

水田 加代子	所 長
貝原 孝雄	次 長
田中 章久	所 員

3) JICAエキスパート

袴着 実	(MOSTE)
吉田 邦彦	(SIRIM)



### 3. 主な調査事項

- (1) 技術移転に必要な主要機材の名称・仕様・台数などの確認。ならびに技術移転との関連性の確認。
- (2) プロジェクトサイトの基盤整備状況の確認。
  - ・サイト地図・面積・建物設計図
  - ・機材の設置スペース、電源、設備条件
  - ・機材配置レイアウトプラン
  - ・専門家執務室・会議室等
- (3) 暫定実施計画 (TSI) の策定、年間計画の策定
- (4) マレーシア側 C/P・スタッフの配置・暫定予算 (5年間) の確認
- (5) プロトタイプシステムの開発内容の確認 (産業分野等)
- (6) その他

#### 4. 調査結果

調査項目	現状及び問題点	調査結果
1. プロジェクトの名称	<ul style="list-style-type: none"> <li>・ AIシステム開発センターとすることで合意。</li> <li>(英語名称): AI System Development Centre</li> </ul>	<ul style="list-style-type: none"> <li>・ マ側よりプロジェクト名称変更の要請があり、JICA本部と相談の上、変更合意した。</li> <li>・ 新プロジェクト名: AIシステム開発ラボラトリ</li> <li>(英語名称): AI System Development Laboratory</li> </ul>
2. プロジェクトの実施機関	<ul style="list-style-type: none"> <li>・ 本プロジェクトの実施機関をSIRIMとすることで合意。</li> </ul>	<ul style="list-style-type: none"> <li>・ SIRIMにて合意していたが、マラヤ大学から、主導権を持って参加したいとの要請が出された。本件については、マ側にて今後参加方法について検討していくとのことであるが、プロジェクトサイトの分散につながらぬようマ側の実施体制につき、注視していく必要がある。</li> </ul>
3. 技術移転内容 ・ プロトタイプシステムの開発概要 ①開発するシステム ②開発手順 ③開発サイクル ④ドメインエキスパートの確保 ⑤開発目標 (プロトタイプの内容) ⑥開発スケジュール	<ul style="list-style-type: none"> <li>・ 医療分野については、診断型知識構造タイプ別エキスパート・システムとすることで合意済みである。</li> <li>・ 産業分野については、マ側にてテーマを検討中。長期調査時までに決定予定。</li> <li>・ 他の開発分野については、技術協力期間の後半に検討する旨合意している。</li> </ul>	<ul style="list-style-type: none"> <li>・ マ側から医療分野1プロトタイプ及び、産業分野での4プロトタイプ開発の同時着手をしたいとの要請を受けたが、マ側体制の整備状況、MIMOS、他の支援等を勘案した結果、1年目は医療分野1プロトタイプ・産業分野1プロトタイプの開発を先行させ、他分野の開発については進捗状況を配慮し、別途協議することとした。</li> <li>・ 医療分野、産業分野のプロトタイプシステムの開発概要について①～⑥の各項目別に協議した。</li> </ul>

調査項目	現状及び問題点	調査結果
<p>4. 機材供与</p> <p>①システム構成</p> <p>②機器仕様</p> <p>③その他システム開発、研修用関連機材</p>	<p>マ側要請機材は以下の通りである。</p> <ul style="list-style-type: none"> <li>・開発用機器及びソフトウェア <ul style="list-style-type: none"> <li>(a)サーバー</li> <li>(b)ワークステーション</li> <li>(c)LAN関連機器</li> <li>(d)UNIXオペレーティングシステム</li> <li>(e)エキスパート・システム開発用ソフトウェア</li> <li>(f)リレーショナルデータベースシステム</li> <li>(g)関連する技術マニュアル、等</li> </ul> </li> <li>・その他機材 <ul style="list-style-type: none"> <li>(a)VCRs</li> <li>(b)TVモニター</li> <li>(c)電子黒板</li> <li>(d)オーバーヘッドプロジェクター</li> <li>(e)フォトコピー機</li> <li>(f)その他</li> </ul> </li> </ul> <p>・マ側は病院等現場への設置を要請している。</p>	<ul style="list-style-type: none"> <li>・マ側より、技術移転に必要な機材につき要請説明を受けたが、各省会議で事前協議していたシステム構成とは、かなり隔たりがあった。プロジェクト全体から見たシステム構成に関するシステム概念、必要機能、性能、使用方法、及び、プロトタイプ開発手法、プロトタイプ開発のプロセス等について詳細に協議の結果、全体規模の中で調整を図り日側の当初案にほぼ近い構成にて了解に達した。システム機器構成概図を添付別紙1に、機材一覧表については添付別紙2の通りである。</li> <li>・現地調達の可能性調査の為、可能な限りの型録、仕様、価格表等の収集を行い、可能性については添付別紙2の機材一覧表に示す通りである。</li> <li>・プロトタイプ開発に伴う、ラボラトリとリモートサイト間の人員、機材の輸送、連絡打合せ等のために自動車の供与要請を受けた。</li> <li>・リモートサイトのワークステーション設置予定場所について、下記の候補地を訪問し、問題がないことを確認した。 <ul style="list-style-type: none"> <li>・医療：クアラルンプール総合病院</li> <li>・産業：PROTON社（自動車製造業） ：USRA TAMPI社（自動車向けプラスチック部品加工業）</li> </ul> </li> </ul>

調査項目	マレーシア側要請内容等	調査結果
<p>5. マ側実施体制</p> <p>a. 建物等プロジェクトサイト基盤整備</p> <p>①サイト地図/面積</p> <p>②建物設計図</p> <p>③建物所有者</p> <p>④電気、ガス、水の供給状況</p> <p>b. 器材処置、維持管理</p> <p>c. 組織</p> <p>d. C/P及びスタッフの配置</p>	<ul style="list-style-type: none"> <li>・センター用建物は'95年4月末までに完成。</li> <li>・サイト地図、建物設計図等の情報は、'94年5月末までに日本側へ連絡。</li> <li>・新館屋完成までの機材、設置場所の暫定のフロア計画等は、'94年5月末までに日本側へ連絡。</li> <li>・病院等現場への設置を要請している。</li> <li>・組織図は事前調査時に提出済み。</li> <li>・'95年5月末日までに暫定計画を日本側へ連絡。</li> </ul>	<ul style="list-style-type: none"> <li>・当初予定されていた新建屋の工事日程が当初予定から遅れ気味のところから、暫定使用を予定していた、既存のブロック24(1F)を本プロジェクト用として全面使用することに変更となった。</li> <li>・フロアの一部については既に空いているが、フロア全体を使用するために、SIRIM内の配置変更、及び内装工事を'95年2月末までに完成させるとのこと。よって、日本人執務室の準備に問題がないことを確認した。今後の工事日程表を入手しフロアプランと共にミニッツに記載した。</li> <li>また、コンピューター設置の為の設備条件、工事に対する要求仕様につき説明、協議し、合意結果をミニッツに記載した。</li> <li>・プロジェクト運営については、全面的にSIRIMが主導となることが決まっております、事前調査時と変更ないことを確認した。組織図を入手しミニッツに記載した。</li> <li>・マラヤ大学などの大学のプロジェクト参加については、MOSTEを中心にマ側で別途協議することになったが、日側は事前協議の結果を前提とした体制となるようマ側に要請し確認した。</li> <li>・スタッフの5年間の人員年次計画を入手しミニッツに記載した。</li> </ul>

調査項目	マレーシア側要請内容等	調査結果
e. ローカルコストの負担	<ul style="list-style-type: none"> <li>・'94年5月末日までに暫定計画を日本側へ連絡。</li> </ul>	<ul style="list-style-type: none"> <li>・ローカルコストについて、5年間の予算計画を入手し、ミニッツに記載した。</li> </ul>
4. 研修員の受入れ	<ul style="list-style-type: none"> <li>・プロジェクトの円滑な立ち上げのために、最初の3年間で集中的に実施することを要請している。</li> <li>・本年度2名の枠（A I 最新技術手法／3週間）がある。</li> </ul>	<ul style="list-style-type: none"> <li>・必要な技術的資質及び研修内容について協議し、結果をミニッツに記載した。</li> <li>・マ側から日本での技術研修について、再度プロジェクトの円滑な立ち上げのために、最初の3年間で集中的に実施することを要請された。</li> <li>・本年度2名の枠について、候補者（リーダー）を打診し、略歴を入手した。</li> </ul>
5. その他 (1)全体計画	<ul style="list-style-type: none"> <li>・事前調査時に暫定実施計画（TIP）にて合意している。</li> </ul>	<ul style="list-style-type: none"> <li>・今後1年間の予定及び、プロジェクト5年間の具体的計画を協議し、結果をミニッツに記載した。</li> </ul>
(2)A Iセンターの将来性	<ul style="list-style-type: none"> <li>・本プロジェクト終了後も継続していくことで合意している。</li> <li>・事前調査時に暫定実施計画（TIP）にて合意している。</li> </ul>	<ul style="list-style-type: none"> <li>・本プロジェクトは国家計画「ビジョン2020」に沿ったプロジェクトであり、プロジェクト終了後も引き続き研究開発の分野で、本ラボラトリを継続発展させていくことを確認した。</li> </ul>
(3)諸外国・国際関係との相関関係	<ul style="list-style-type: none"> <li>・長期調査にて調査する。</li> </ul>	<ul style="list-style-type: none"> <li>・現在進行している諸外国との共同プロジェクト等の状況について聴取し、ミニッツに記載した。</li> </ul>
(4)知的所有権の取扱い	<ul style="list-style-type: none"> <li>・事前調査時に日本側の方針は説明済み。</li> </ul>	<ul style="list-style-type: none"> <li>・事前協議時の協議結果について確認した。</li> <li>協議結果を踏まえ、マ側は専門部署に相談の上、実施協議にて結論を出すことになった。</li> </ul>

## 5. 調査員所見

タジュデンSIRIM長官自らの指示も含め、プロジェクト名称、サイトの変更や、開発のプロトタイプ開発について医療と産業の同時開始、及び産業分野の4プロトタイプの同時着手など協議開始時から、マレイシア側の積極的なアプローチがあった。機材についても事前調査時と異なった要請が出されたが、これは本プロジェクトの実施カウンターパートが産業関係主体のSIRIMとなり、産業分野のプロトタイプ開発に対する検討が急速に進んだ結果と推測される。

機材等のマレイシア側の要請内容プレゼンテーションを受けた後、内容確認及び日本側との隔たりを埋めるべく協議を進め、全体の規模を見ながら調整した結果、当初日本側にて事前に協議し準備した案に近い形で落ちつけることが出来た。

協議は比較的スムーズかつフランクに進行したが、強く感じたのはマレイシア側の本プロジェクトに対する大きな期待と熱意である。マレイシア側の人員計画は、当初のマレイシア側案をかなり上回る人員計画が提案されておりマレイシア側の積極的な対応が感じられる。予算案についてもかなりの額を積み上げており、本件に対する意気込みが読みとれる。現在のところ、マレイシア側の迅速且つ適切な対応がなされており、良好な進捗状況といえる。

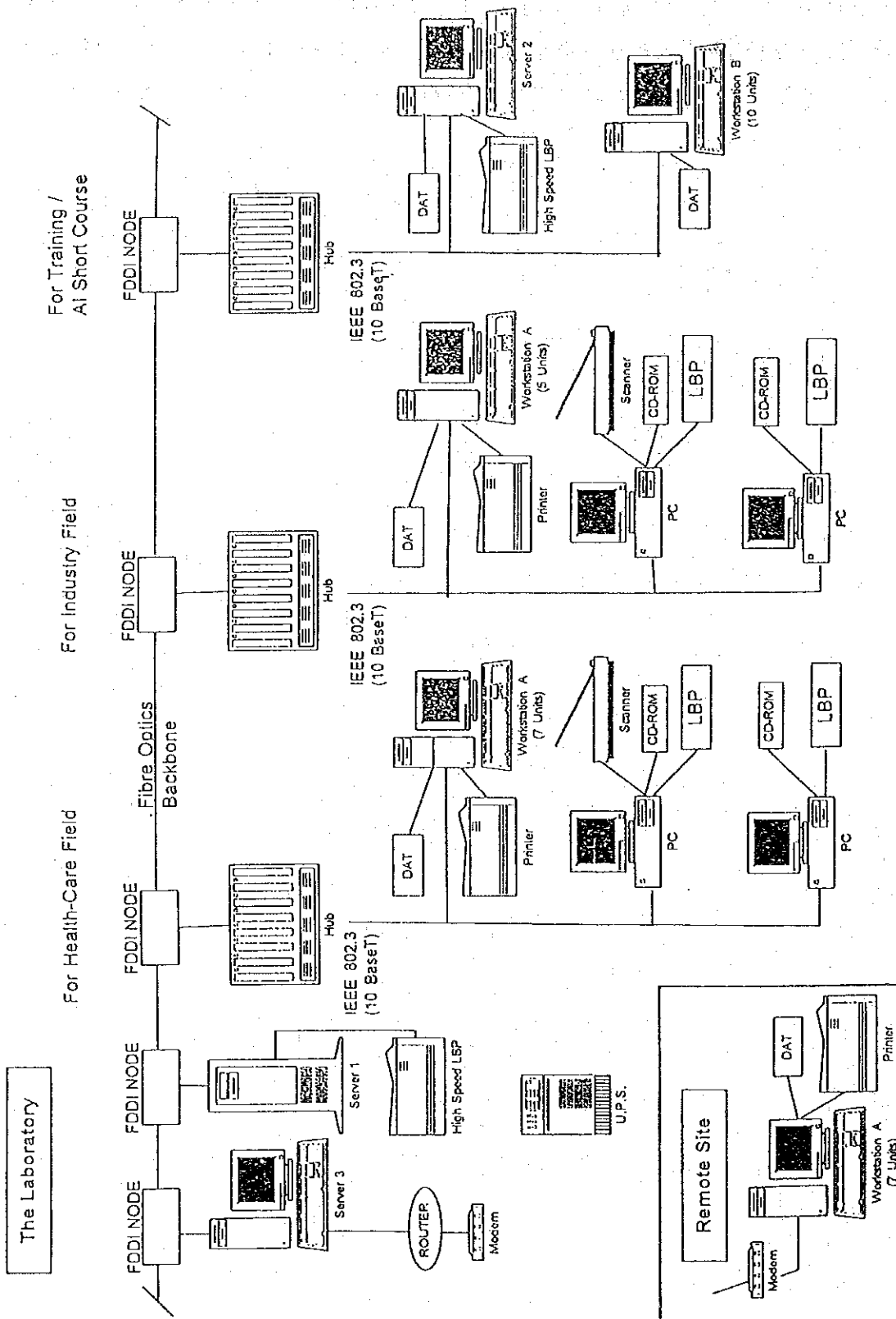
本件今後の課題として以下の項目に付き、フォローしていく必要がある。

- (1) プロジェクトの円滑な立ち上げを図るために、事前調査時に要請があった中核技術者に対する日本での技術教育に対し、プロジェクトの初期段階での前倒し、集中実施を再度要請された。本プロジェクトの性格を考えるとマレイシア側の要請は、妥当なものと考えられ考慮する必要がある。
- (2) 本件のようなコンピュータに関連するプロジェクトは、関連機材の技術進歩が非常に早くプロジェクトの途中で機材が陳腐化する可能性もあり、機材の更新が可能な仕掛け作りを検討してもらいたいとの話がマレイシア側よりあった。今後の課題として検討していく必要がある。
- (3) 本プロジェクトの実施機関は、SIRIMということで決定済みであるが、マラヤ大学から主導権を含めての参加要請がなされた。これは本来マレイシア側内で議論すべきことが図らずも表面化したのであるがマレイシア側内で調整をしていくとのことである。体制の変更、2本立化により運営の複雑化、サイトの分散化に繋がりがかねない為、現行体制の維持を申し入れると共にマレイシア側内の円満な解決を依頼した。今後のマレイシア側の実施体制に十分な注視をしていく必要がある。

本プロジェクトは、ソフトウェア開発、複数の現地機関のプロジェクト参加（SIRIM, MIMOS, 大学等）、一部機器のリモートサイト設置等の今までにない特徴があるが、今後この様なプロジェクトが増加することが予想されます。柔軟な対応を求められて行くと思われる。

# AISDEL SYSTEM OVERVIEW

別紙 1





## AISDEL 機材一覧表 (案)

1994/8/19

No.	機材名	概略仕様	優先 順位	現地調達 の可能性	数量案			
					1期A	1期B	2期	合計
1	サーバ・ワークステーション							
	1)UNIXサーバ1	中央演算装置RISC型、100MHz以上 記憶容量512MB以上 ディスプレイコンソール装置 (14"白黒) 磁気ディスク装置 記憶容量9.8GB以上 バックアップ用DAT装置 A4-シフプリンター A4、高速(20枚/分以上) LANインターフェイス等、必要機器を含む	A	NO		1		1
	2)UNIXサーバ2 (ネットワーク対応用)	中央演算装置RISC型、60MHz以上 記憶容量160MB以上 ディスプレイコンソール装置 (17"カラー) 磁気ディスク装置 記憶容量6.0GB以上 バックアップ用DAT装置 LANインターフェイス等、必要機器を含む	A	NO			1	1
	3)UNIXサーバ3 (AIショートコース講師用)	中央演算装置RISC型、60MHz以上 記憶容量160MB以上 ディスプレイコンソール装置(17"カラー) 磁気ディスク装置 記憶容量6.0GB以上 バックアップ用DAT装置 A4-シフプリンター、A4、高速型(20枚/分)	A	NO			1	1
	4)UNIXワークステーション (7"モニター開発用)	中央演算装置RISC型、60MHz以上 記憶容量 160MB以上 ディスプレイモニター (17"カラー) 磁気ディスク装置 記憶容量4.0GB以上 バックアップ用DAT装置 プリンター レザビーム式、A4 キーボード、マウス、LANインターフェイス等必要機器を含む	A	NO	4	8		12
	5)UNIXワークステーション (AI研修用)	中央演算装置 RISC型、50MHz以上 記憶容量140MB以上 ディスプレイモニター (17"カラー) 磁気ディスク装置 記憶容量2.0GB以上 バックアップ用DAT装置 キーボード、マウス、LANインターフェイス等、必要機器を含む	A	NO			10	10
	小計				4	9	19	32

AISDEL 機材一覧表 (案)

1994/8/19

No.	機材名	概略仕様	優先 順位	現地調達 の可能性	数量案			
					1期A	1期B	2期	合計
2	ソフトウェア	サーバ・ワークステーション用、使用権5年以上 関連する総てのマニュアルが付属していること						
	1)サーバ用 ・OS  ・プログラミング言語 ・開発用ソフトウエア1 ・開発用ソフトウエア2 ・データベース	UNIXオペレーティングシステム 国際標準に準拠 LAN対応機能を有していること 必要なユーティリティを有していること C, C++ エキスパートシステム構築ツール CASEツール リレーショナルデータベース	A	NO		1	1	1
	2)ワークステーション用 ・OS  ・プログラミング言語 ・開発用ソフトウエア1 ・開発用ソフトウエア2 ・データベース	UNIXオペレーティングシステム 国際標準に準拠 LAN対応機能を有していること 必要なユーティリティを有していること C, C++ エキスパートシステム構築ツール CASEツール リレーショナルデータベース	A	NO	4	8	7 10	19 10
	小計				4	8	17	29

## AISDEL 機材一覧表 (案)

1994/8/19

No.	機材名	概略仕様	優先 順位	現地調達 の可能性	数量案			
					1期A	1期B	2期	合計
3 PC システム								
	システム1	486 DX2 100MHz, 32MB 17"High Resolution Moniteor(Color) HDD:4.0GB, FD: 3.5" 1.44MB Graphic Accelarator Card Laser Printer :A4 Flatbed Scanner A4,600DPI,Color OS:MS-WINDOW Word Processor, Spread Sheet, Graphic, C, Image Analysis & OCR Software	A	YES		2		2
	システム2	486 DX2 66MHz, 32MB 14"High Resolution Moniteor(Color) HDD:500MB, FD: 3.5" 1.44MB Graphic Accelarator Card Laser Printer: A4 OS:MS-WINDOW Word Processor, Spread Sheet, Graphic, C	A	YES		2		2
4	LAN	Network Cable, Router, HUB, Node, HUB Extenslon Cable, Pach Panel, others	A	YES	1			1
5	Others	Modem	A	YES			1	1
							7	7
6	UPS	50KVA	A	YES	1			1
7	複写機	高速度版	A	YES	1			1
8	液晶ディスプレイ	OHP,ポインター付き	B	YES		1		1
9	OHP	レーザーポインター、スクリーン付き	A	YES		1		1
10	電子黒板	ホワイト機能付き	A	YES	1			1
11	フライトプロジェクター		C	YES		1		1
12	ラージスクリーンプロジェクター	70インチ以上、PC/WS接続機能付き	A	NO			1	1
13	VCR s	マルチシステム	B	YES	1			1
14	TV s	マルチシステム、ワイドスクリーン	B	YES	1			1
15	自動車	マイクロバス	A	YES	1			1
小 計								



# 資 料

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MINUTES OF DISCUSSION  
BETWEEN THE JAPANESE EXPERT SURVEY  
TEAM AND THE AUTHORITIES CONCERNED  
OF THE GOVERNMENT OF MALAYSIA ON THE  
JAPANESE TECHNICAL COOPERATION FOR  
THE PROJECT ON AI SYSTEM DEVELOPMENT  
LABORATORY (AISDEL)

SIGNED ON 29 JULY 1994

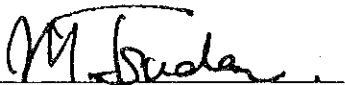
MINUTES OF DISCUSSIONS  
BETWEEN  
THE JAPANESE EXPERT SURVEY TEAM  
AND  
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF MALAYSIA  
ON THE JAPANESE TECHNICAL COOPERATION FOR THE PROJECT  
ON  
AI SYSTEM DEVELOPMENT LABORATORY

The Japanese Expert Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Mamoru TSUDA, visited Malaysia from 13th July to 29th July, 1994, for the purpose of clarifying in detail the issue related to the provision of major items by the Japanese Government under the Japanese Technical Cooperation Project (hereinafter referred to as "the Project") for AI System Development Laboratory (hereinafter referred to as "the Laboratory").

During its stay in Malaysia, the Team had a series of discussions to exchange views on the Project with the authorities concerned of the Government of Malaysia (hereinafter referred to as "the Malaysian Side") and also carried out a field survey to the proposed Project sites and the relevant facilities.

As a result of the discussions, both sides reached understandings concerning the matters referred to in the document attached herewith.

Malaysia, 29th July, 1994



Mr. Mamoru Tsuda  
Leader,  
Expert Survey Team,  
Japan International  
Cooperation Agency,  
Japan



Hj. Abdul Aziz b. Abdul Manan  
Deputy Director-General &  
Director of Corporate Services  
for Director-General  
Standards and Industrial  
Research Institute of Malaysia,  
Malaysia



## THE ATTACHED DOCUMENT

Based on the requirement from the Government of Malaysia, the Team and the Malaysian Side had a series of discussions on following major items.

### 1. Name of the Project

The Malaysian Side requested the name of the Project as "ARTIFICIAL INTELLIGENCE DEVELOPMENT LABORATORY" because the Project is managed under Advanced Manufacturing Technology Centre (hereinafter referred to as "AMTC") of Standard and Industrial Research Institute of Malaysia (hereinafter referred to as "SIRIM"). The Team stated that the Project had been named as "AI SYSTEM DEVELOPMENT CENTRE" in the previous meeting between the Japanese Preliminary Survey Team and the Government of Malaysia. The Team and the Malaysian Side had a discussion on this item. Based on further discussion, both sides reached understanding concerning the name of the Project as "AI SYSTEM DEVELOPMENT LABORATORY".

### 2. Site of the Project

The Malaysian Side stated that the construction schedule of Block 25, SIRIM supposed to be the Laboratory was not clarified and Block 24 would be prepared for the site of the Project. The Team and the Malaysian Side had a discussion of this item, both sides agreed that the site of the Project is at 1st floor, Block 24, SIRIM.

### 3. Prototype Development

#### 3.1 Themes of Prototype Developments

The Malaysian Side proposed themes of prototype developments as follows;

- A prototype development for the Management Information System for Accident and Emergency in Health-Care
- A prototype development for Scheduling System for Trim Line in Automobile Industry

The Malaysian Side requested that the prototype developments of Health-Care and Automobile Industry must be started at the same time. The Team stated that for the successful prototype developments of Health-Care field and Industry field the

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participation of the core staff who has an experience of AI expert system would be better. The Malaysian Side understood this statement. And both sides agreed that the Malaysian counterparts should focus on two prototype developments in the first year of the Project. And the Malaysian Side requested that the prototype developments of other themes should be started from the second year of the cooperation period. Based on the Malaysian Side's request, both sides agreed that the other prototype developments will be considerable in the later stage of the cooperation period depending on the progress of the first two prototype developments. The provisional prototype developments are as follows;

- Mould and Die prototype
- Intelligent Processing and Manufacturing prototype
- Building and Construction prototype

### 3.2 Outline of Prototype Developments

The Team and the Malaysian Side had a discussion on outline of prototype developments based on the following items:

- Subjects
- Major technical transfer
- Points of development
- Number of staff and domain experts
- Goal of prototype development

Based on further discussion, both sides reached understandings concerning the outline of prototype developments as shown in Annex II.

### 4. Equipment

The Team and the Malaysian Side had a discussion on the equipment for prototype development and for AI short courses. Based on further discussion, the Malaysian Side presented to the Team the list of equipment with priority as shown in Annex III and Annex IV. The Team stated that in consultation with the Malaysian Side, it was agreed that the equipment necessary for the effective technology transfer would be provided to the Laboratory, based on the principles of the Project-Type Technical Cooperation. The Malaysian Side understood the Team's statement. Both sides decided the other equipment which was not listed in Annex III and Annex IV will be prepared by the Malaysian Side.

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## 5. Malaysian Implementation Structure

### 5.1 Site Map of the Laboratory

The Malaysian Side submitted the site map of the Laboratory as shown in Annex V.

### 5.2 Detailed Schedule of Building Construction of the Laboratory

The Malaysian Side submitted the detailed schedule of building construction of the Laboratory as shown in Annex VI.

### 5.3 Building Requirement

The Team presented a plan of the building requirement and both sides had a discussion on this item. Based on further discussion both sides reached mutual understandings concerning the item as shown in Annex VII.

### 5.4 Allocation of Expenditure for Computer Installation and Preparation

The Team presented a plan of the allocation of expenditure for computer installation and preparation. Both sides had a discussion on this item. Based on further discussion both sides reached understandings concerning this item as shown in Annex VIII.

### 5.5 Consultation on Computer Installation

The Malaysian Side requested to Japan to dispatch some engineers for technical consultation on computer installation.

### 5.6 Field Survey

Both sides carried out a field survey to the following places;

- General Hospital, Kuala Lumpur
- USRA TAMPI (M) SDN BHD, Shah Alam
- Perusahaan Otomobil Nasional Berhad (PROTON), Shah Alam

The Team and the Malaysian Side had a series of discussion on the necessity of the installation of equipment at remote sites. The Team understood that the installation of equipment at remote sites such as hospitals and manufacturing plants is necessary to enable collection of domain knowledge and evaluation of prototype development. The Team requested that the equipment at the remote sites should be managed properly. Both sides agreed on the management of the equipment at remote sites as shown in Annex IX.

5.7 Implementation Structure of the Laboratory

The Malaysian Side submitted the implementation structure of the Laboratory which include tentative designated persons on the Malaysian Side and the relationship with the Japanese Side as shown in Annex X.

5.8 Tentative Schedule of Staff Allocation

The Malaysian Side submitted the tentative schedule of staff allocation as shown in Annex XI.

5.9 Tentative Schedule of Budget Allocation

The Malaysian Side submitted the tentative schedule of budget allocation as shown in Annex XII.

6. Counterparts' Training in Japan

6.1 Staff Qualification, Training Goals and Necessary Curriculum

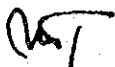
The Team explained a plan of the staff qualification, training goals and necessary curriculum for the training. Both sides had a discussion on this item. Based on further discussion both sides reached understandings concerning this item as shown in Annex XIII.

6.2 Number of Staffs to be Trained in Japan

The Malaysian Side requested that tentatively 6 persons would be trained in Japan for the first year. The Team explained to the Malaysian Side that the number of staff to be trained in Japan would be decided depending on the necessity and the Japanese budgetary limitations. The Malaysian Side understood this explanation.

6.3 Brief Personal Record of the Leading Staff Members of the Laboratory

The Team requested the Malaysian Side to submit to JICA K.L. brief personal records of the two leading staff members (Tentatively : Director and Administration Manager) of the Laboratory who would be dispatched to Japan before April, 1995 after the Record of Discussions.





## 7. Others

### 7.1 Tentative Schedule of Implementation

Both sides had a discussion on this item. Based on further discussion, revised tentative schedule of implementation was drawn up as shown in Annex XIV.

### 7.2 The Starting Date of Cooperation Period

Both sides had a discussion on this item. Based on further discussion, both sides agreed that the Project would start tentatively in March, 1995, when the Japanese coordinator arrive at the Laboratory.

### 7.3 Future Plan of the Laboratory

The Malaysian Side mentioned that the establishment of the Laboratory is in line with the nation's "Vision 2020". The existence of the Laboratory will provide strong technical support in the areas of Research and Development not only during the project period but also in the near future.

### 7.4 Other Technical Cooperation in Computer Related Field

The Team was acknowledged by the Malaysian Side about the other technical cooperation programme with other countries such as:

- (1) Rapid prototyping technology (CAD/CAM) with McDonnell Douglas Corp., USA
- (2) Finite element analysis with University of Leeds, UK

### 7.5 AI Short Courses

Both sides discussed a plan on AI short courses. Both sides agreed on the plan as shown in Annex XV.

### 7.6 Matter Related to Copyright and Licensing

The Team asserted Japanese rights to use software and related materials and referred to the possibility of usage in similar projects in other countries. The Malaysian Side commented that this matter needs further consultation with SIRIM legal office and MOSTE. Both sides agreed that the details of this item would be decided during the meeting between the Japanese Implementation Survey Team and the Government of Malaysia.

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7.7 Office for the Japanese Coordinator

The Team requested the Malaysian Side to provide a suitable room and adequate furniture for the Japanese coordinator by February, 1995. The Malaysian Side agreed with the Team's request.

7.8 Prototype Development Process

The Team and the Malaysian Side had a discussion on this item. Based on further discussion, both sides agreed on this item as shown in Annex XVI.

8. Conclusion

Both Sides accepted this Minutes of Discussion with reference to the previous Minutes of Discussion signed on the April 4, 1994.

Based on further discussion, both sides agreed on almost all the major items as mentioned above. If everything proceeds smoothly, the Implementation Survey Team will be in Malaysia to conclude and sign the Record of Discussion before the end of 1994.

*M.T.*

*[Signature]*

## ATTENDANTS OF THE MEETINGS

## 1. Japanese Side

## (1) Japanese Expert Survey Team

Mr. Mamoru TSUDA      General Manager, Computer Education Division,  
Center of the International Cooperation for Computerization  
(CICC)

Dr. Hitoshi MIYAKE      Associate Professor, Director, Physical Education and Health  
Care Center, Nagaoka University of Technology

Mr. Ryoichi KUNO      International Administration Department, Planning &  
Coordination Division, Center of the International  
Cooperation for Computerization (CICC)

## (2) JICA Malaysia Office

Ms. Kayoko MIZUTA      Resident Representative

Mr. Takao KAIBARA      Deputy Resident Representative

Mr. Akihisa TANAKA      Assistant Resident Representative

## (3) Embassy of Japan

Mr. Yutaka FUJIWARA      Second Secretary

Mr. Koji KANBARA      Second Secretary

## (4) JICA Expert

Mr. Kunihiko YOSHIDA      Chief Advisor, Product Tooling (Mold and Die)  
Product and Machine Development Centre, SIRIM

Mr. Minoru HAKAMAGI      Science Advisor, MOSTE

## 2. Malaysian Side

## (1) Economic Planning Unit (EPU)

Ms. Harvindar Kaur      Principal Assistant Director  
Industry Section

## (2) Ministry of Science, Technology and Environment (MOSTE)

Dr. Hamzah Kassim      Director, Science and Technology Division

(3) Standards and Industrial Research Institute of Malaysia (SIRIM)

Dato' Dr Ahmad Tajuddin Ali	Director- General
Hj. Abdul Aziz b. Abdul Manan	Deputy Director- General & Director Corporate Services
Dr. Chong Chok Ngee	Director, Research and Technology Development Division
Mr. A. Aziz Mat	Deputy Director, (Corporate & Business Development) Corporate Services Division
Mr. Asmadi Md Said	Head, Advanced Manufacturing Technology Centre (AMTC)
Mr. Raja Muda Raja Ngah	Research Manager, Software Development Group AMTC
Mr. Goh Chee Kuan	Research Manager, Mechatronics Group AMTC
Mr. Hau Tam Shiam	Research Manager, Manufacturing Systems Group AMTC
Mr. Mohamed Nasir b. Hj. Abdul Wahid	Research Manager, Circuit & Electronics System Design Group, AMTC
Mr. Bashir Mohamad Bali Mohamad	Research Manager, Assembly Technology Group, AMTC
Mr. Abdullah Hamid	Head, Computer Services Unit
Mr. Zulkifli Abdullah	Head, Physical Development Unit
Ms. Siti Khamnah Hashim	Research Officer, Planning and Coordination Unit
Mr. Aznam Abdullah	Research Officer, Software Development Group, AMTC
Mr. Sarifulnizam Abu Bakar	Research Officer, Software Development Group, AMTC
Mr. Mohd. Suhair b. Embong	Research Officer, Software Development Group, AMTC

(4) Malaysian Institute of Microelectronics Systems (MIMOS)

Dr. Zulkifli Abdul Kadir Bakti	Director, Industrial Technology Division
Mr. Mohamed Rawidean Mohd Kassim	Research Officer
Mr. Lamshary Budin	Research Officer

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(5) University of Malaya

Dato' Dr. Hj. Abdullah Sanusi Ahmad

Vice-Chancellor

Dato' Dr. Ahmad Nawawi

Deputy Vice-Chancellor (Academic)

Dr. C.T. Chua

Associate Professor / Deputy Dean  
Faculty of Medicine

Prof. Ghauth Jasmon

Dean, Faculty of Engineering

Prof. Dato' Dr. Khairuddin Yusof

Professor/Head of Social Obstetrics &  
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## The Outline of Prototype System in Health-Care

### (1) Outline of Prototype :

Develop a prototype of medical diagnosis support system in emergency and accident environment. In this prototype, the possible diseases will be listed up with those possibilities by feeding patient's symptoms to the workstation. This prototype supports doctors or medical assistants when they make diagnosis.

This is just a prototype of expert system for supporting medical diagnosis, and it is not directly developed into the practical system. Jobs such as patient treatment or the analysis of input data from medical equipment are beyond the system scope.

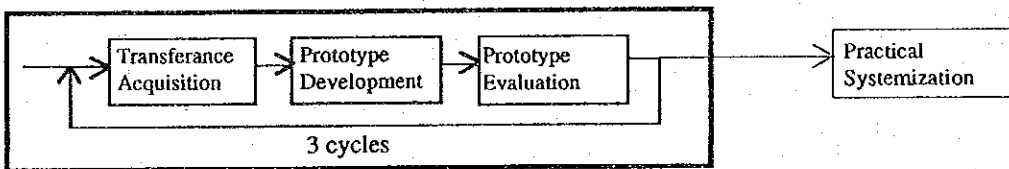
### (2) Available Subjects :

The following 4 subjects are selected as the available subjects.

- 1) Respiratory System
- 2) Cardiology
- 3) Traumatology
- 4) Saito Intestinal (- upper and lower )

### (3) Development Cycle :

#### PROTOTYPE SCOPE



#### a. Knowledge Acquisition

This involves interview to domain experts and acquisition of the knowledge which the domain experts have on his domain area.

#### b. Prototype Development

This involves development of working model of target AI system.

#### c. Prototype Evaluation

This involves validating and verification of the working model.

(4) Development Structure :

Item	Initial Model	1st Model	2nd Model	Available
1 System Goals	Available Subject Number	3	4	Example Symptom: Central Chest Pain Example Disease Myocardial infarction Angina pectoris
	Available Subject	1. Cardiology System 2. Respiratory System 3. Saito Intestinal System	1. Cardiology System 2. Respiratory System 3. Saito Intestinal System 4. Traumatology	
2 Main Technical Transfer	Symptom	300	500	The main techniques and knowledge to be transferred in each model
	Disease	50	100	
		• Tools, Computer Languages • Diagnosis type Resolution • Basic Ability • ES Building Techniques (Analysis/Design)	• Expert System Techniques (Cooperation/Reasoning) • GUI Building Techniques	
3 Development Point	Basic Part Design	Cooperation Reasoning Design	Fuzzy Reasoning Design	
4 Development Period	Knowledge Acquisition	4 months	2 months	2 months
	Development	8 months	9 months	10 months
	Evaluation	1 month	1 month	2 months
	Total	13 months	12 months	14 months
5 Development Staff	Head	1	1	One of the core staffs will be in charge of the AI short course from the beginning of the 2nd model
	Core Staffs	4	6	
	Staffs	3	3	
	Domain Expert	6	6	

## The Outline of Prototype System in Industry Field

Suggested application areas have been identified: Automotive, Mould and Die, Intelligent Processing and Manufacturing, and Building and Construction.

Automotive Prototype is selected to carry out from the beginning of the Project and other prototype developments will be considered in later stage of the cooperation period and depending on the progress of the first prototype development.

### (1) Outline of Automotive Prototype

Develop a prototype of scheduling system for a trim line (internal & external assembly line) which is the core part of the manufacturing line in an automobile industry. Both the internal and external line requirement changes dynamically with time. This prototype produces a monthly manufacturing schedule by providing constrains such as delivery date information. For the monthly schedule, a daily manufacturing schedule is then produced for day to day scheduling activities.

This is a prototype of scheduling-type expert system for manufacturing line. The system will be tested on the actual production line by the Malaysian side to verify its suitability. The actual practical systemization is beyond the prototype.

### (2) Outline of Mould and Die Prototype

The purpose of developing this prototype is to transfer human expertise or know-how of mould and die making to the target intelligent system. The system will then be able to determine the optimum mould and die design and provide the best design solution before machining process can be carried out for a particular product.

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(3) Outline of Intelligent Processing and Manufacturing Prototype

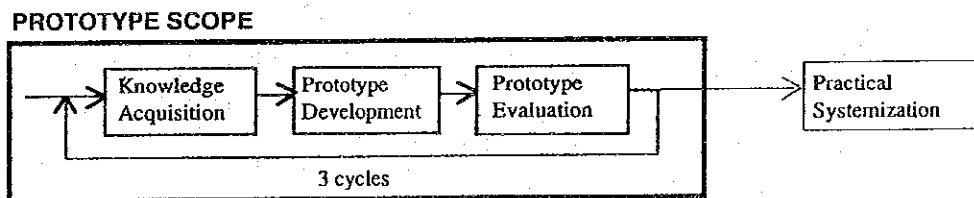
Intelligent Processing and Manufacturing (IPM) is typically associated with processes such as welding, composites fabrication, casting and forging. In each case, Quality Control, Process Control, and Environment Control variables must be controlled to maintain optional operation of the processes. Interfaces and control for these custom sensors are the goal of this prototype, with the use of fuzzy logic and/or neural network modules.

(4) Outline of Building and Construction Prototype

The present method for Building and Construction Plan preparation is a tedious and time consuming process. This plan is then submitted by the Architect or Engineer to the local authority for Development Plan approval. The local authority personnel to speed up the verification and approval process of the Development Plan. The system will incorporate standards and rules/regulation in the form of building by laws required by the Federal and State authority.

The prototype may also include verification and approval of environmental assessment as required by the Department of Environment.

(5) Development Cycle



a. Knowledge Acquisition

This involves interview to domain experts and acquisition of the knowledge which the domain experts have on his domain area.

b. Prototype Development

This involves development of working model of target AI system.

c. Prototype Evaluation

This involves validating and verification of the working model.

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(6) Development Structure :

Item	Initial Model	1st Model	2nd Model	Available
1 System Goals	Number of Processes with Constrains Nil : same model	4	6	Sedan/Aeroback Manual/AT with/without Air Condition Specification for Export/Domestic
2 Technical Transfer Goals	•Tools, Computer Languages •Schedule type Resolution Basic Ability •ES Building Techniques	•Resolution Algorithm	•Simulation Techniques •Tuning (Accuracy, Performance)	Transfer all techniques and knowledge to Malaysia
3 Development Point	Fundamental Part Design	Algorithm Study	Simulation	
4 Development Period	Knowledge Acquisition	6 months	8 months	2 months
	Development	4 months	5 months	4 months
	Evaluation	1 month	2 months	2 months
5 Development Staff	Total	11 months	15 months	8 months
	Head Core Staff	8	1	7
Staff		6	6	One of the core staffs will be in charge of the AI short course from the beginning of the 2nd model
Domain Expert		6	6	

### Required System Concept

- (1) The implemented system must follow the Malaysian standard operating system of OPEN SYSTEM.
- (2) The operating system of all computer should be UNIX, in order to achieve UNIX based standardisation for both server and workstation.  
This is effective for system standardisation and administration.
- (3) The system should be constructed as a Client/Server System (CSS), because it is one of the best methods to achieve the Concurrent Engineering environment.
- (4) A server should be used as a database server, printing server, source program storage, and storage of educational materials which are going to be used in the short course.
- (5) The workstation should be capable for individual construction and execution of the expert system.
- (6) One workstation should be allocated to each engineer under the method of Concurrent Engineering. This is necessary as one prototype development consist of several subsystem to be developed concurrently by each engineer, through out the course of the project.
- (7) One workstation should be allocated to each trainee in the AI short course in order to train trainees effectively. One workstation should be allocated to the instructor.

#### The major functions of CSS

- (1) Data transformation function between server and workstation should be provided.
- (2) The source program on the workstation can be up-loaded to the server, and the source program on the server can be down-loaded to the workstation.
- (3) The server should provide the environment for executing the combined expert system by using workstations.

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## Required Functions for Expert System Building Tools

( In relating to Prototype Development )

The expert system building tools should have the following functions;

- 1) Rule base reasoning.
- 2) Capable for building diagnosis-type expert system and scheduling-type expert system at the same building tool.
- 3) Capable for object-oriented programming which have the following characteristics:
  - 1) reusable of resources
  - 2) data based function(object=data+process)
  - 3) modeling which is closed to real model
  - 4) spiral type development to pursue smooth system development
  - 5) rapid prototyping
- 4) Capable for fuzzy reasoning. In order to build some prediction logic into the system or to handle ambiguous figures in the system.
- 5) Capable for merging subsystem in distributed computing environment. This will allow subsystems to be built separately and later to run it as a combined system.
- 6) Supports visual programming by GUI construction, enables the reduction of work load.
- 7) Could be linked with neural network system to realize self-learning system in the future.
- 8) Capable for natural language user interface construction.
- 9) Expert System Building Tool must have the linkage with the popular RDB.

RDB is used for the following data storage.

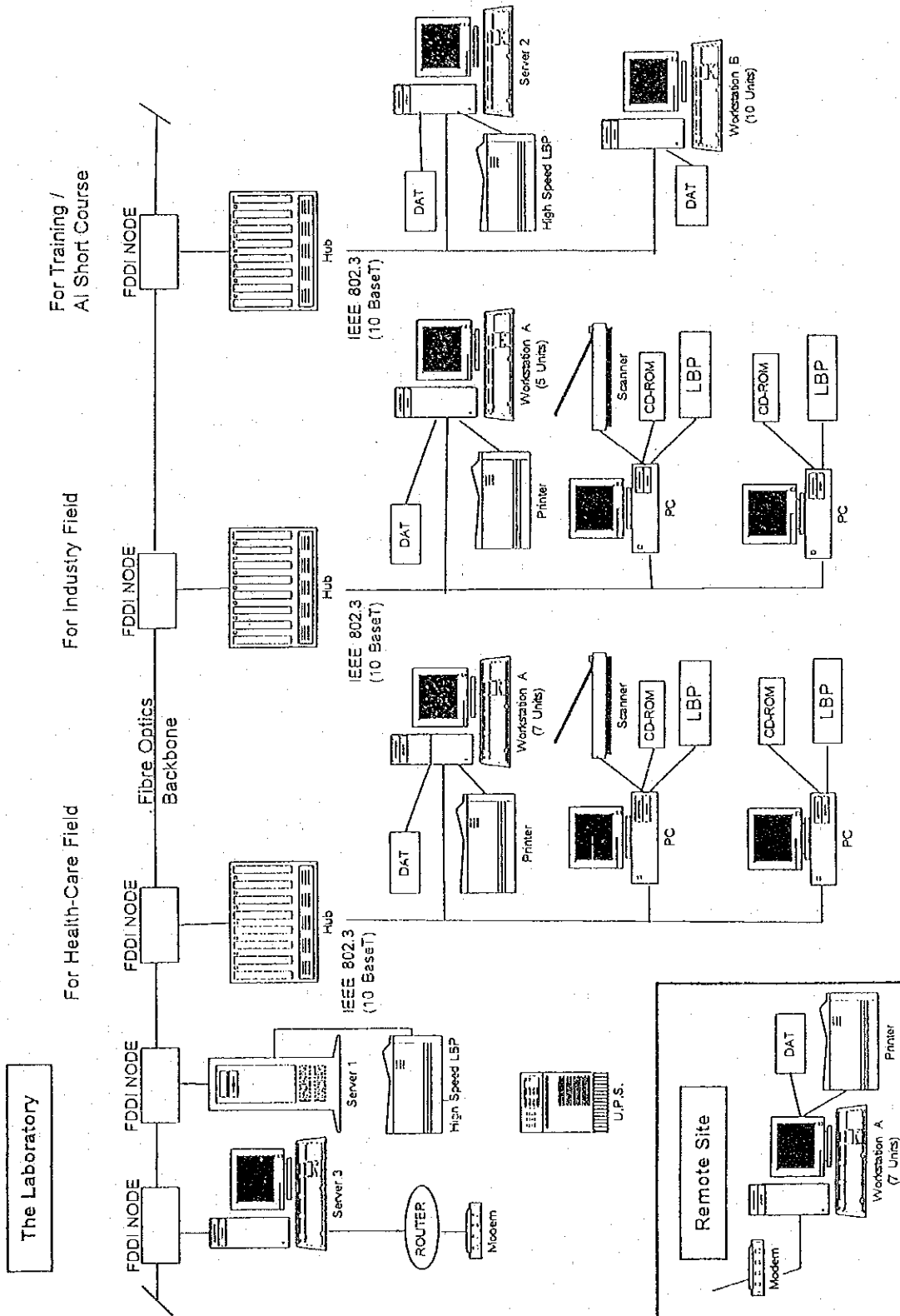
Medical field	:	Symptom data
		Disease data
		Patient's medical history data
		Accumulation and reference of the diagnosis result
Industry field	:	Facility information
		Received order information
		Delivery data information
		Parts in stock information

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# AISDEL SYSTEM OVERVIEW



LIST OF MACHINERY AND EQUIPMENT

## 1. Hardware

Equipment	Priority			TOTAL	Remarks
	A	B	C		
(1) Server 1 - RISC (100MHz or more) - Main Memory of 512MB or more - Disk Storage of 9.8GB or more - DAT, Laser Printer (20 ppm) - LAN Interface : IEEE802.3(10 BASE T) - Console:14 inch monochrome - OS: UNIX		1		1	For Industry and Health-Care Prototype Application Development
(2) Server 2 - RISC (60MHz or more) - Main Memory of 160MB or more - Disk Storage of 6.0GB or more - DAT, Laser Printer (20 ppm) - LAN Interface: IEEE802.3(10 BASE T) - Console:17" inch Color - OS: UNIX			1	1	For Training and AI Short Course
(3) Server 3 - RISC (60MHz or more) - Main Memory of 160MB or more - Disk Storage of 6.0GB or more - DAT - LAN Interface: IEEE802.3(10 BASE T) - Console:17" inch Color - OS: UNIX			1	1	For Communication Purpose

Equipment	A	B	C	TOTAL	Remarks
(4) Workstation A	4	8		12	Prototype Development of Health Care & Industry
- RISC (60MHz or more)					
- Main Memory of 160MB or more					
- Disk Storage of 4.0GB or more			7	7	For Remote Sites
- DAT, Printer (8 ppm)					
- LAN Interface : I					
IEEE802.3(10 BASE T)					
- 17 inch colour					
- OS : UNIX					
(5) Workstation B			10	10	AI Short Course
- RISC (50MHz or more )					
- Main Memory of 140MB or more					
- Disk Storage of 2.0GB or more					
- DAT					
- LAN Interface :					
IEEE802.3(10 BASE T)					
- 17 inch colour					
- OS : UNIX					

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## 2. Software

Equipment	Priority			TOTAL	Remarks
	A	B	C		
(1) OS					
UNIX (with X-Window, Motif )		1	2	3	For Server
(Include right to use for 5 years)	4	8	17	29	For Workstation
(2) Languages					
C, C++		1	2	3	For Server
(Include right to use for 5 years)	4	8	17	29	For Workstation
(3) Expert System Building Tools					
Capable for object-oriented programming		1	2	3	For Server
(Include right to use for 5 years)	4	8	17	29	For Workstation
(4) Case Tools	4	8	17	29	For Workstation
(5) RDBMS					
Provide Networking function		1	2	3	For Server (Server Function)
(Include right to use for 5 years)	4	8	17	29	For Workstation

## 3. Necessary Equipment for LAN

Equipment	Priority			TOTAL	Remarks
	A	B	C		
(1) Network cabling			1 set	1 set	Male connector at both ends
22-26 AWG Shield Twisted Pair					Length: depend on WS layout
UTP AT & T Level 5					
(2) Router			1	1	
V35, V42, Rs232C					
(3) HUB			6	6	Multi-port repeater for
Stackable HUB, 12Ports					IEEE802.3 (10 BASE T)
IEEE802.3 (10 Base T )					RJ-45 female connectors
(4) NODE			5	5	NODE for FDDI
					with IEEE802.3 (10 BASE T) Interface
(5) HUB Extension Cable			1	1	Cable to connect between HUBs.
(7) Patch Panel					
(8) Modem			1	1	For the Laboratory
			7	7	For Remote Sites

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**4. PC System**

Equipment	Priority			TOTAL	Remarks
	A	B	C		
(1) PC System 1 - 486 DX2 , 100MHz - SCSI-2,7 Slots - Hard Disk of 4.0 GB - RAM of 32 MB - 3.5" 1.44 MB FD - 17" High resolution Monitor - Graphic Accelerator Card - Laser Printer : A4 - Flatbed Scanner : A4,600bpi, Color - OS : MS-WINDOW - Application Wordprocessor,Spread sheet Graphic,C - Image analysis & OCR			2	2	To be shared by Health care and Industry in source code up loading to WS Include for TCP/IP Emulator
(2) PC System 2 - 486 DX2 ,66MHz - SCSI-2 - Hard Disk of 500MB - RAM of 32 MB - 3.5" 1.44 MB FD - 14" Color Monitor - Graphic Accelerator Card - OS : MS-WINDOW - Application Wordprocessor,Spread sheet Graphic,C - Laser Printer: A4		2		2	For Training Materials Include for TCP/IP Emulator

**5. UPS**

Equipment	Priority			TOTAL	Remarks
	A	B	C		
(1) UPS 50 KVA			1Set	1 Set	For the equipment within the Laboratory

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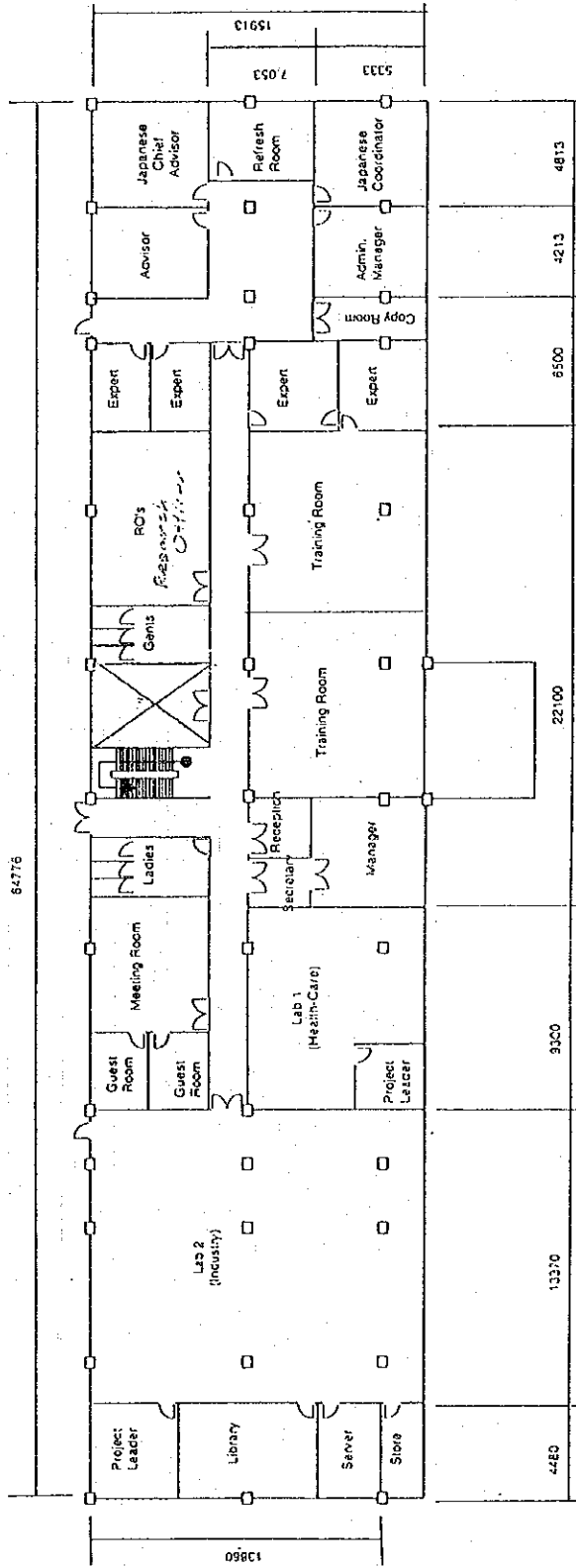
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Other Equipment of The Laboratory

No.	Item	QTY	Specification	Priority	Remarks
1	Photocopying Machines	1	High Speed	A	<ul style="list-style-type: none"> <li>For copying documents during prototype developments</li> <li>For preparation of text books for AI Short Course</li> </ul>
2	Liquid Crystal Display Plate	1	with OHP and Pointer	B	<ul style="list-style-type: none"> <li>For technical transfer conducted by Japanese experts</li> <li>For preparation in AI Short Course</li> <li>To use for AI seminar</li> </ul>
3	Overhead Projectors	1	With Laser Pointer and Screen	A	<ul style="list-style-type: none"> <li>For technical transfer conducted by Japanese experts</li> <li>For preparation in AI Short Course</li> <li>To use for AI seminar</li> </ul>
4	Electronic White Boards	1	Electronic White Board with copy facility	A	<ul style="list-style-type: none"> <li>For discussion and review of the projects</li> <li>For meeting to pursue the development</li> </ul>
5	Slide Projector	1		C	<ul style="list-style-type: none"> <li>For discussion and review of the projects</li> </ul>
6	Large Screen Projector	1	70 inch screen Capable to display screen of PC or workstation	A	<ul style="list-style-type: none"> <li>For AI seminar</li> <li>For AI short course</li> <li>For real image protection</li> </ul>
7	VCRs	1	Multi-system	B	<ul style="list-style-type: none"> <li>To play educational software available in any other countries for staff training and AI Short Course</li> </ul>
8	TVs	1	Multi-system with wide screen		
9	Vehicle	1	Micro Bus	A	<ul style="list-style-type: none"> <li>To carry personnel and equipment between the Laboratory and Remote Sites, and others</li> </ul>

Site Map

AI SYSTEM DEVELOPMENT LABORATORY LAYOUT PLAN



Block 24 - A (First Floor)

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Schedule of Building Construction of The Laboratory

Artificial Intelligence System Development Laboratory (AISDEL)  
 Building Planning Schedule  
 (Block 24 - A)

Activities	1994					1995		
	Sep	Oct	Nov	Dis	Jan	Feb	Mar	
1.0 Staff Relocation	XXXX	XXXX	XX					
2.0 Laboratory Renovation	XX	XXXX	XXXX					
3.0 Raised Floor			XX	XXXX				
4.0 Electrical Wiring				XX	XXXX			
5.0 Networking Cabling				XX	XXXX			
6.0 Telephone Cabling				XX	XXXX			
7.0 Room Furnishing				XX	XXXX			
7.1 Carpeting						XX	XX	
7.2 Furniture						XXXX	XXXX	
7.3 Partition						XX	XX	
8.0 Air Conditioning							XXXX	



## BUILDING REQUIREMENT

Rooms where server and workstations will be installed shall be designed in compliance with conditions as shown in the following tables.

## 1. Environmental Conditions of Computer Room

No.	ITEM	REFERENCE VALUE
1	Condition of air	Dust concentration must be less than $0.15\text{mg/m}^3$
2	Vibration	$2.45\text{ m/s}^2$ or less at the floor of installation sites.
3	Harmful gases	The gas density must be very low enough, so it does not harm the operators and corrode the computers.
4	Floor covering material	a. Insulation resistance ( $1 \times 10^5$ to $10^8\text{ Wcm}$ ) b. Oil resistance (oil will be used for maintenance) c. Fire proof material d. Dust-free material
5	Wall and ceiling	a. Anti-electrostatic material b. Dust-free material c. Sound absorbing and sound insulation material d. Incombustible material
6	Window	a. Do not expose the devices to direct sunlight. (Installation of the curtain or blind is recommended.) b. Keep devices away from dust, corrosive gas and salty wind.
7	Entrance	Minimum effective width of 1.2m or more and height of 1.8m or more.
8	Safety	Measures must be taken against fire, flood and earthquake, and also for the safety of operators.
9	Sanitary facilities	Measures must be taken against rats and insects.
10	Fire extinguisher	Installation of the fire extinguisher for electrical equipment is recommended.
11	External electromagnetic interference	Select an installation site where the magnetic flux density is less than $10^{-6}\text{ T}$ .
12	Static electricity	When laying carpets where the devices are to be installed, use conductive carpets to prevent shocks caused by static electricity.
13	Lighting	a. Avoid lighting up only the work area and keeping the surroundings dark. b. Do not place an intense light source within the user's vision. c. Keep direct light and any reflected light away from the user's vision. d. Do not expose the display screen to direct light.
14	Others	a. Do not splash water on the devices. b. Be sure to leave enough space (doors and hallways at least 300 mm wider than the device width) for easy delivery. c. When spraying the room with insecticides, place protective covers on the devices to prevent contamination.




## 2. Requirement for Air Conditioning Facilities

Temperature and humidity ranges to be considered in the installation sites

ITEM	OPERATING	NON-OPERATING
Temperature	10 to 35 °C	-10 to 40 °C
Humidity	35 to 80 %	10 to 80 %

- (1) Do not place any heat sources such as radiators or heaters near the workstations. (5m, min.)
- (2) Moist printer forms may cause form feed errors. Installation of dehumidifiers is recommended in humid environments.
- (3) Dew condensation should be avoid.  
When start operation of the devices from non-operating environment, do not operate them until the room temperature becomes the same as regular temperature of operating environment. When changing the room temperature, the ratio of changing temperature should be 10°C/hr.

## 3. Input Power Requirement for Computer( Primary Power for UPS)

a. For 200V devices

No.	ITEM	VALUE
1	Voltage (steady state)	200 - 240 VAC ±10%
2	Voltage (transient state)	200 - 240 VAC ±15%(less than 500ms)
3	Frequency (steady state)	50 Hz or 60 Hz
5	Number of phase	single phase 2 wire and ground
6	Wave form distortion	10% or less
7	Capacity	20 kVA or more

b. For 100V devices (When necessary )

No.	ITEM	VALUE
1	Voltage (steady state)	100 VAC ±10%
2	Voltage (transient state)	100 VAC ±15% (less than 500ms)
3	Frequency (steady state)	50 Hz or 60 Hz
5	Number of phase	single phase 2 wire and ground
6	Wave form distortion	10% or less
7	Capacity	30 kVA or more

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## ALLOCATION OF EXPENDITURE FOR COMPUTER INSTALLATION AND PREPARATION

	Allocation of Expenditure	
	Malaysia side	Japan side
1. Transportation		
(1) From Japan to Port of Malaysia		X
(2) From Port of Malaysia to the Centre	X	
(3) From the Centre to remote sites or vice versa	X	
2. Installation and Adjustment		
(1) Dispatch of supervisors for installation and adjustment		X
(2) Workers for installation, unpacking etc.	X	
(3) Equipment electric plug replacement	X	
3. Maintenance expenditure for computer system, air conditioning system etc.	X	
4. Boundary of installation		
(1) Power Supply		
(A) Utility Power (commercial power, transformer, molded circuit breaker)	X	
(B) Main PDB (Power Distribution Board)	X	
(C) UPS (Uninterruptible Power Supply) for Server	X	
(D) PDBs for Server and Workstations	X	
(E) PDBs for Air conditioner	X	
(F) Transformer for 100VAC, When necessary	X	
(G) Cabling route for power supply (cable duct, trench, cable rack, conduit pipe)	X	
(H) Cabling materials		
(a) from Utility Power to Main PDB	X	
(b) from Main PDB to Terminal PDB	X	
(c) from Terminal PDB to UPS	X	
(d) from Main PDB to PDB for air conditioner	X	
(e) from UPS to Power outlet receptacles for Server	X	
(f) from UPS to Power outlet receptacles for Workstation	x	
(g) from Terminal PDB to Power outlet receptacles for LAN Equipment	X	
(I) Power outlet receptacles for Server and Workstation	X	
(J) Power outlet receptacles for LAN Equipment	X	
(K) Power outlet receptacles for maintenance and miscellaneous	X	
(L) Installation work of (A) to (I) above	X	
(2) LAN		
(A) Cabling route for LAN Cables (cable duct, trench, cable rack, conduit pipe)	X	
(B) Cabling materials		
(a) Backbone LAN (FDDI)	X	
(b) from FDDI NODEs to HUBs	X	
(c) from HUBs to Servers (IEEE802.3(10 BASE T))	X	
(d) from HUBs to Workstations (IEEE802.3(10 BASE T))	X	
(C) Installation works of (A), (B) above	X	
(3) Grounding Works		
(A) Grounding materials		
(a) for computer system (Server and Workstations)	X	
(b) for UPS, Main PDB, PDBs and air conditioner	X	
(c) for LAN Equipment	X	
(B) Installation of (A) above	X	

	Allocation of Expenditure	
	Malaysia side	Japan side
(4) Air-conditioning Facilities		
(A) Air conditioner for installation sites of devices		X
(B) Air conditioner for staff rooms and other necessity rooms		X
(C) Seal for windows (installation sites)		X
(5) Other Interior Works		
(A) Renovation for existing rooms		X
(B) Partition wall		X
(C) Painting		X
(D) Construction of (A) to (C) above		X
(6) Other preparation works		
(A) Adequate fire extinguisher facilities		X
(B) Desks and chairs for Server and Workstations		X
(C) Desks and chairs for Japanese Experts		X
(D) Desks and chairs for staffs and trainees		X
(E) Blind for windows		X
(F) Cabinets and racks for staffs and library		X
(G) Others		X
(H) Preparation of (A) to (G) above		X

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### Management of equipment at remote sites

To pursue the technical transfer project, all necessary equipment shall be set not only at the Centre but also remote sites from initial model development until the completion of the second model.

This is to verify the completeness of the required system and to have continuous cooperation, which is absolutely necessary for the project, from both domain experts and users for knowledge input and system confirmation.

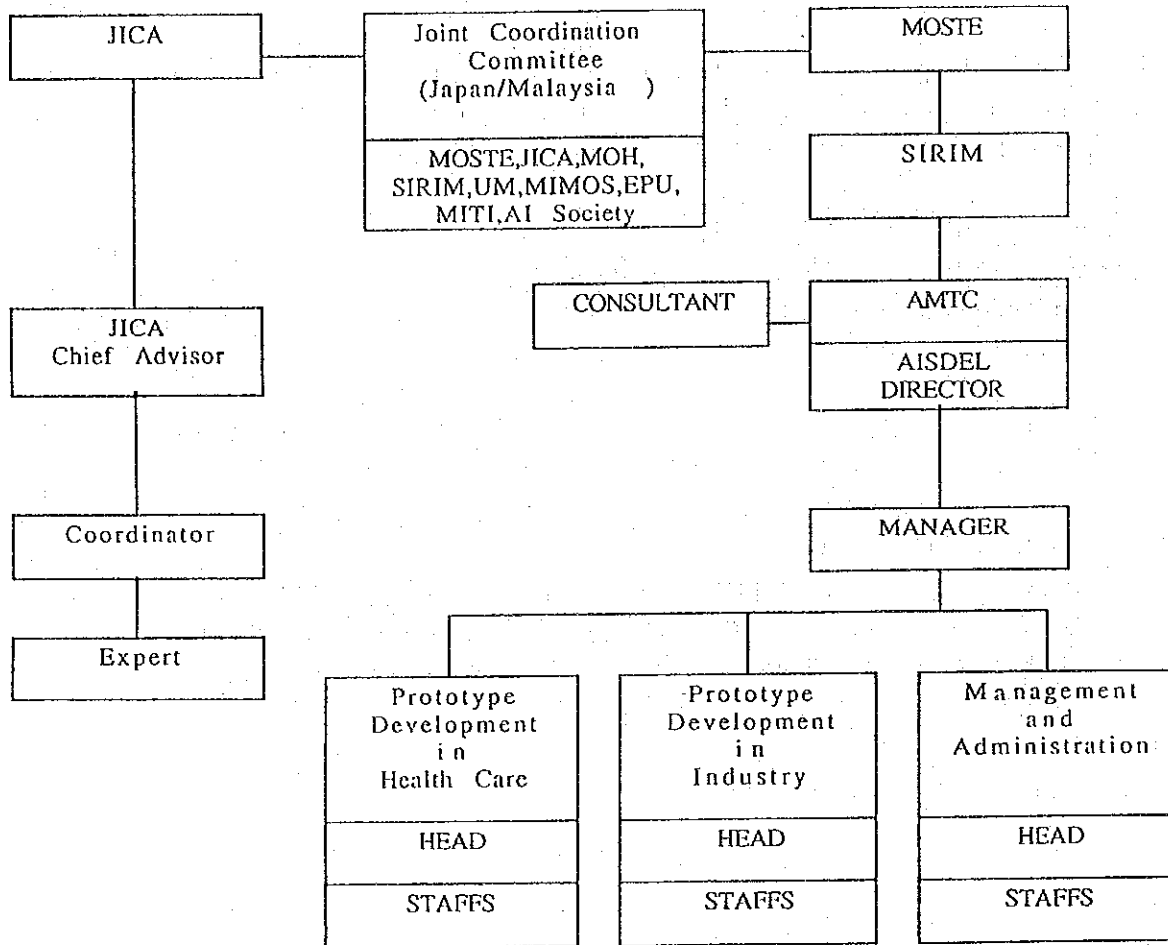
The followings are the guideline for the management of equipment at remote sites

- (1) Install equipment for the remote sites at the Centre.
- (2) Lend equipment to remote sites when necessary.
- (3) Return the equipment back to the Centre after cooperation period.
- (4) The Centre will take the responsibility during the lending period.
- (5) The equipment will be used for the development of Malaysia original system in the future.

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Implementation Structure of the Laboratory



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### Tentative Schedule of Staff Allocation

#### 1. Staff of The Laboratory

Staff	Year	1994	1995	1996	1997	1998	1999
Manager		1	1	1	1	1	1
Administrative Staff			2	2	2	2	2
Secretary			1	1	1	1	1
Driver			1	1	1	1	1
Head (Health-Care)		1	1	1	1	1	1
Core Staff (Health-Care)		4	4	4	7	7	7
Staff (Health-Care)		3	3	3	3	3	3
Head (Industry)		1	1	1	1	1	1
Core Staff (Industry)		6	8	8	8	8	8
Staff (Industry)			6	6	6	6	6
Total of Staff		16	28	28	41	41	41

1995(Industry): Core Staff ..... 1 : Training /Seminar Coordinator  
 ..... 1 : Officer  
 Staff..... 6 : Programmers  
 Admin staff..... 1 : Admin. Assistant  
 ..... 1 : Clerk

#### 2. Domain Expert

Domain Expert	Year	1994	1995	1996	1997	1998	1999
For Health-Care		6	6	6	6	6	6
For Industry		6	6	6	6	6	6
Total		12	12	12	12	12	12

Note : Domain Expert do not belong to the Laboratory.

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Tentative Schedule of Budget Allocation

Unit : 1,000 RM

Year	1994	1995	1996	1997	1998	1999	Total
Items							
Staff charges	675	960	960	960	960	960	5,475
Building Renovation	235	50	50	50	50	50	485
Equipment Maintenance	42	66	138	324	324	324	1,218
Electricity, Gas, Telephone, Travel allowance, Others	105	165	345	810	810	810	3,045
Total Annual Budget	1,057	1,241	1,493	2,144	2,144	2,144	10,223

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Staff Qualification & Training Goals

	Core Group Staffs	Staffs	Domain Experts
Qualification	<ul style="list-style-type: none"> <li>•Graduate computer science in university or polytechnics or equivalent knowledge.</li> <li>•Understand outline of UNIX</li> <li>•Understand methodology of system analysis</li> <li>•Experience of C programming based on UNIX or PC or equivalent knowledge</li> </ul>	<ul style="list-style-type: none"> <li>•Understand outline of UNIX</li> <li>•Experience of C programming based on UNIX or PC or equivalent knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Experts of the developed prototype field who are in charge of the prototyping or have equivalent knowledge.</li> </ul>
Training Goals	<p>&lt; Training in Japan &gt;</p> <ul style="list-style-type: none"> <li>•Have the following knowledge, and be able to teach the 3rd person under the supervision of Japanese experts.</li> <li>•AI, Basic knowledge engineering</li> <li>•Techniques of using expert system building tools</li> <li>•Expert system building techniques (diagnosis type, scheduling type)</li> </ul> <p>Also have the following knowledge</p> <ul style="list-style-type: none"> <li>•Project management skill</li> <li>•System Administration/Maintenance/Evaluation skill</li> <li>•Instruction &amp; Presentation skill</li> </ul> <p>Also, be able to develop expert system under the supervision of Japanese experts.</p>	<p>&lt; Training in Malaysia &gt;</p> <ul style="list-style-type: none"> <li>•Have the following knowledge</li> <li>•AI, Basic knowledge engineering</li> <li>•Techniques of using expert system building tools</li> <li>•Expert system building techniques ( diagnosis type, scheduling type)</li> </ul>	Nil
Prototype Development Goals	<ul style="list-style-type: none"> <li>•Be able to develop advanced prototype ( diagnosis type, scheduling type)</li> <li>•Be able to teach general computer engineer expert system building techniques through prototype development</li> <li>•Be able to teach in AI short course</li> </ul>	<ul style="list-style-type: none"> <li>•Be able to develop expert system individually (diagnosis type, scheduling type)</li> </ul>	Nil

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Expected of Training Curriculum

Course	Purpose	Subject
Basic	To study the basic related knowledge as overall review (regardless of knowledge by each person)	AI&ES(basic) UNIX(basic) C, C++ languages(basic) Distributed processing system(basic) ES building tools(basic)
Advanced	To study the advanced related knowledge for expert system construction	UNIX(advanced) C, C++ languages(advanced) ES building tools(advanced) User interface design
Techniques	To acquire the necessary techniques for prototype development and instruction	RDBMS Methodology Interview technique Instruction technique
Experience in Workshop	In order to make the most of the above knowledge and techniques in practical uses, more than one third of the time will be used for workshop.	

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Annual Work Plan For 1995(Nov. 1994 - Nov. 1995 including preparation period)

Item	1994		1995												96			
	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
1 Project																		
1.1 Health-care and Industry																		
1.1.1 Staff training																		
1.1.1.1 Chief advisor																		
1.1.1.2 Coordinator																		
1.1.1.3 Project management and design of expert system																		
1.1.1.4 Expert system building techniques																		
1.1.1.5 Expert system development tools																		
1.1.2 Prototype Development																		
2 Japan side																		
2.1 Dispatch of Japanese experts																		
2.1.1 Long term experts																		
2.1.1.1 Chief advisor																		
2.1.1.2 Coordinator																		
2.1.1.3 Project management and design of expert system																		
2.1.1.4 Expert system building techniques																		
2.1.1.5 Expert system development tools																		
2.1.2 Short term experts																		
2.1.2.1 Supervisor for installation and adjustment of workstation and server																		
2.2 Provision of equipment																		
2.3 C/P training in Japan																		
3 Malaysia side																		
3.1 Establishment of the Laboratory																		
3.1.1 Interia and furnish																		
3.1.2 Official opening of Laboratory																		
3.2 Arrangement of the facilities																		
3.2.1 Project rooms																		
3.2.2 Office facilities, accommodations and other necessary facilities for the Japanese experts																		
3.2.3 Other facilities for operating the Laboratory																		
3.3 Provision of counterparts and administrative staff																		
3.3.1 Manager																		
3.3.2 Advisor																		
3.3.3 Project leader (Health-care)																		
3.3.4 Core staff (Health-care)																		
3.3.5 staff (Health-care)																		
3.3.6 Administrative staff																		

Tentative Schedule of Implementation

Calendar	94	95	96	97	98	99	2000
1 Term of technical cooperation Japan Fiscal Year							
2 Project				- Project Start 3 / '95			
2.1 Health-care							
2.1.1 staff training							
2.1.2 prototype development							
2.2 Industry field							
2.2.1 staff training							
2.2.2 prototype development							
2.3 AI short course							
2.3.1 Preparation							
2.3.2 Course							
2.4 Joint Coordination Committee (Once / Year)		Δ	Δ	Δ	Δ	Δ	Δ
3. Japan side							
3.1 Long term experts							
3.1.1 Chief advisor (1)							
3.1.2 Coordinator (1)							
3.1.3 Project management and design of expert system (1)							
3.1.4 Expert system building techniques (2)							
3.1.5 Expert system development tools (1)							
3.2 Short term experts *							
3.3 Provision of equipment		WS Δ Δ	WS Δ				
3.4 C/P training in Japan		SERVER & WS					
3.5 Japan Survey Team (Once / Year)		Δ	Δ	Δ	Δ	Δ	Δ

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Calendar		94	95	96	97	98	99	2000
Japan Fiscal Year								
4	Malaysia side							
4.1	Establishment of the Laboratory							
4.1.1	Interior and furnish							
4.1.2	Official opening of the Laboratory		Δ					
4.2	Arrangement of the facilities		July					
4.2.1	Project rooms							
4.2.2	Office facilities, accommodations and other necessary facilities for the Japanese experts							
4.2.3	Other facilities for operating the Laboratory							
4.3	Provision of counterparts and administrative staff							
4.3.1	Manager							
4.3.2	Advisor							
4.3.3	Project leader(Health-care)							
4.3.4	Core staff (Health-care)							
4.3.5	staff (Health-care)							
4.3.6	Project leader (Industry field)							
4.3.7	Core staff (Industry field)							
4.3.8	staff (Industry field)							
4.3.9	Administrative staff							

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\* Dispatched when necessity arises

AI Short Course(Tentative)I. Expert System for Business Professionals

No	Theme	Period
1	Outlines of artificial intelligence and expert system. • Trends • Examples of application systems • Lecture on knowledge representation	1 day
2	Introduction on expert system • How to pick out the applicable field • Expert system development process(analysis, design, programming)	1 day
3	Workshop of simple expert system • Knowledge representation in supporting tools • How to operate supporting tools • Implementation	1 day

- Duration : 3 days
- Target : Business professionals who want to be involved in expert system development.
- Overview : This course is designed to provide trainees with general knowledge about AI and to provide them with methods for the representation of specialized knowledge
- Goals : Trainees who complete this course will be able to
- (1) Analyze the knowledge in their respective specialty fields and judge whether expert system can be applied to their business fields.
  - (2) Collaborate with knowledge engineers on the development of expert system in their fields of speciality.
- Qualified persons : Experienced business professionals who can perform tasks alone in their fields of speciality.




## 2. Expert System for Computer Engineers

No	Theme	Period
1	Outlines of artificial intelligence and expert system. <ul style="list-style-type: none"><li>• Trends</li><li>• Examples of application systems</li><li>• Lecture on knowledge representation</li></ul>	1 day
2	Basic knowledge of supporting tools <ul style="list-style-type: none"><li>• Knowledge representation in supporting tools</li></ul>	0.5 day
3	Workshop of expert system development <ul style="list-style-type: none"><li>• Problems analysis</li><li>• Knowledge representation design</li><li>• How to operate workstation and supporting tools</li><li>• Programming</li></ul>	3.5 day

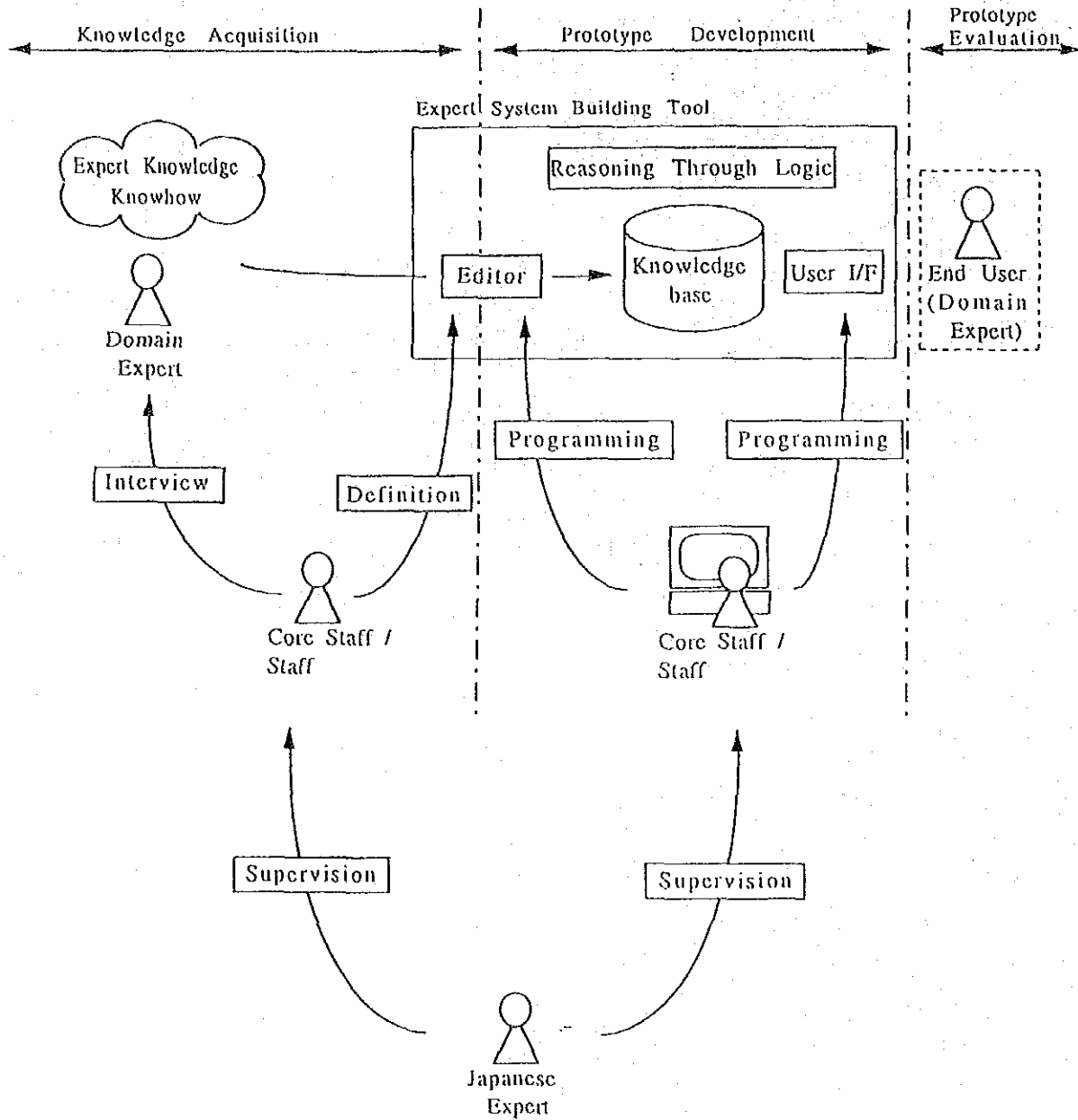
- Duration : 5 days
- Target : Computer engineers who want to study how to develop expert system.
- Overview : This course is designed to obtain quick understanding of how to develop expert system through workshop.
- Goals : Trainees who complete this course will be able to understand the basis of concept, functions, and building method for expert system development.
- Quilified persons : Computer engineers who have knowledge of UNIX, C or C++.

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# Prototype System Development Process

## 1. Outline of Expert System Development

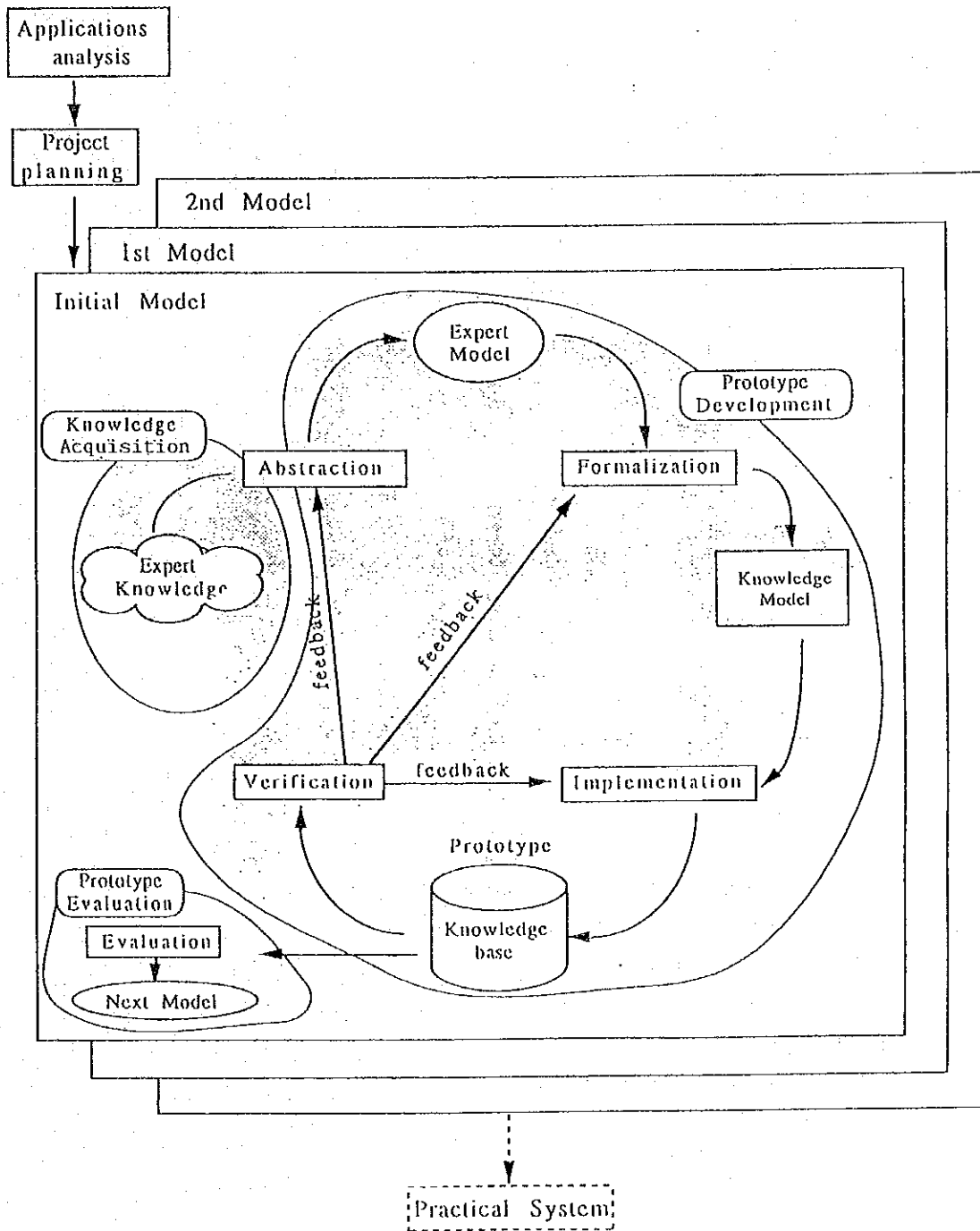


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## 2. ES Prototype System Development Process

### 2.1 Phases of ES Prototype System Development



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## 2.2 Knowledge Acquisition Process ( Abstraction)

Step	Description	Points of Knowledge Acquisition
1	General explanation from the domain expert	Understand the meaning of technical terms
2	Explanation in details of the objective system	Make sure the meaning of those doubt key words or technical terms by interview completely
3	Knowledge abstraction of the objective system	Arrange knowledge in documents ( Visualization)
4	Confirmation of the objective system	Check the inter-relationships of the knowledge by reinterview according to documents

## 2.3 Contents and outputs of each phase

### (a) Abstraction

#### Contents

- (1) Frame definition of resolution
- (2) Definition of keywords or technical terms

#### Outputs

- (1) Object lists -- tables of structures, attributes, quantity
- (2) Lists of constrains and strategies
- (3) Tables of goals, priorities
- (4) Images of expert model and system in actual use

### (b) Formalization

#### Contents

- (1) Understanding of knowledge model
- (2) Knowledge classification and arrangement
- (3) Process flow design
- (4) Maintenance form design

#### Outputs

- (1) Table-related chart
- (2) Process flowchart ( rules flow )
- (3) Data flowchart

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(c) Implementation

Contents

- (1) Coding
- (2) Debugging

Outputs

- (1) Knowledge base
- (2) Peripheral programs ( C, etc )
- (3) External files

(d) Evaluation

Contents

- (1) Contradiction elimination and just enough adjustment
- (2) Test cases collection
- (3) Evaluation and knowledge change

Outputs

Prototype system or feedback to the respective phase

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