

行政院及所屬各機關出國報告
(出國類別：其它)

汰換高雄、馬公終端航管雷達案 第一次合約管理暨系統設計審查會議

服務機關：民用航空局飛航服務總臺

姓名職稱：	陳順發	技 正
	康智育	課長
	李俊才	副工程司
	蔡上田	工務員

出國地區：法國巴黎

出國期間：中華民國 99 年 6 月 11 日~99 年 6 月 27 日

報告日期：中華民國 99 年 8 月 24 日

提 要 表

系統識別號：	C09902632					
計畫名稱：	汰換高雄、馬公終端航管雷達案第1次合約管理會議暨系統設計審查會議					
報告名稱：	汰換高雄、馬公終端航管雷達案第1次合約管理暨系統設計審查會議					
計畫主辦機關：	交通部民用航空局					
出國人員：	姓名	服務機關	服務單位	職稱	官職等	E-MAIL 信箱
	陳順發	交通部民用航空局	供應室	技正	薦任(派)	聯絡人 sf_chen@msl.anws.gov.tw
	康智育	交通部民用航空局飛航服務總臺	航電技術室	課長	薦任(派)	
	李俊才	交通部民用航空局飛航服務總臺	高雄裝修區臺雷達設備臺	副工程司	薦任(派)	
	蔡上田	交通部民用航空局飛航服務總臺	高雄裝修區臺馬公助航臺	工務員	薦任(派)	
前往地區：	法國					
參訪機關：	THALES公司					
出國類別：	其他					
出國期間：	民國99年06月11日至民國99年06月27日					
報告日期：	民國99年08月24日					
關鍵詞：	雷達					
報告書頁數：	60頁					
報告內容摘要：	本次會議舉行目的，係依契約規定，由本總臺派員赴承商原製造廠研討專案執行時程、設備製造、購售雙方履行契約之各項配合工作及重大問題之協商處理；另依據採購契約規定，由THALES公司於設計審查會議前提供包括系統規格文件、介面控制文件、系統測試計畫、技術手冊、維護手冊、相關圖說及備份零組件需求建議清單等各項契約文件，由本總臺審視後，於設計審查會議雙方就文件內容進行討論、釋疑及更正，釐清各項疑點以俾購案可依契約規定期限順利執行完成。					
電子全文檔：	C09902632_01.doc					
出國報告審核表：	C09902632_A.doc					
限閱與否：	否					
專責人員姓名：	陳碧雲					
專責人員電話：	02-23496197					

目 次

壹、目的	4
貳、出席人員	6
參、過程	7
肆、會議結論	10
伍、心得與建議	15
陸、附錄	16

壹、目的

鑒於本總臺馬公機場現有之 TRAC2100/MSSR 雷達及高雄國際機場現有之 ASR-9/MSSR 雷達分別為我國西部及南部地區提供航路及終端近場航管服務之極重要雷達，其使用年限已逾 15 年，為避免馬公雷達服務中斷影響西部空域航路航機之雷達管制作業或高雄雷達服務中斷影響南部空域航機離到場管制作業，爰由民航局授權所屬之飛航服務總臺於 97 至 100 會計年度編列「汰換高雄、馬公終端航管雷達計畫」預算，以汰換現有之馬公中程雷達及高雄終端雷達各乙套，以提昇臺北飛航情報區西部航路及高雄國際機場之飛航服務品質及安全。

前述計畫於 98 年 6 月由本總臺委託臺灣銀行採購部辦理「高雄、馬公終端航管雷達採購」，於 99 年 1 月 8 日決標予澳洲 THALES LTD 公司(以下簡稱 THALES 公司)，履約期限自決標次日起 2 年內完成。

本第 1 次合約管理會議暨系統設計審查會議舉行目的，係依契約規定，由本總臺派員赴承商原製造廠研討專案執行時程、設備製造、購售雙方履行契約之各項配合工作及重大問題之協商處理；另依據採購契約規定，由 THALES 公司於設計審查會議舉行前提供契約交付文件(Contract Data Requirements List, CDRL)，內容包括系統規格文件(SYSTEM SEGMENT SPECIFICATION, SSS)、介面控制文件(INTERFACE CONTROL DOCUMENTS, ICD)、系統測試計畫(SYSTEM TEST PLAN, STP)、技術手冊(Technical Manuals, TM)、維護手冊(Maintenance Manuals)、相關圖說(Drawings and Associated Lists)及備份零組件需求建議清單(Provisioning Parts List)等各項文件，由本總臺審視上述之各項文件後，於設計審查會議雙方就文件內容進行討論、釋疑及更正，釐清各項疑點以俾購案可依契約規定期限順利執行完成。另高雄雷達機房使用原 ASR-9 雷達機房，THALES 公司必需負責拆除原有 ASR-9 雷達後進行新雷達架設，天線座及天線罩等配合工程亦由 THALES 公司負責；馬公雷達機房由本總臺負責興建，有關雷達建築物的天線座及天線罩部分因牽涉雷達天線之設計，需在機房設計時列入考慮項目；上述機房工程須與

THALES 公司取得澄清及共識，避免裝備架設時因建築物與設備間之連接問題造成時程延誤或妨礙契約執行。

貳、出席人員

一、總臺出席人員

陳順發 民用航空局飛航服務總臺供應室、技正
康智育 民用航空局飛航服務總臺航電技術室、課長
李俊才 民用航空局飛航服務總臺高雄裝修區臺、副工程司
蔡上田 民用航空局飛航服務總臺高雄裝修區臺、工務員

二、THALES 公司出席人員

Mr. Thomas Delalande (THALES 公司、本購案之專案經理)
Mr. Jean Fumeux (THALES 公司、後勤經理)
Mr. Herve Dutheil (THALES 公司、雷達產品經理)
Mr. Christian Vidal (THALES 公司、土木工程師)
Mr. Patrick Lorot (THALES 公司、產品工程師)
Mr. Sylvain Colin (THALES 公司、產品工程師)
Mr. Guillaume Cornu (THALES 公司、產品工程師)
Mr. Pascal Jezequel (THALES 公司、產品工程師)
陳鴻裕 (大同世界科技股份有限公司、資深經理)

三、代理商出席人員

閔娟娟 (熙懷行有限公司、經理)

參、過程

一、前言

「高雄、馬公終端航管雷達採購案」(以下簡稱本購案)於 98 年 12 月 30 日開標，於 99 年 1 月 8 日決標予澳洲 THALES LTD 公司設計製造之 STAR2000/RSM970S 產品得標(高雄雷達設備為 STAR2000/RSM970S；馬公雷達設備為 RSM970S)。

本購案規劃初期即已考量爾後契約執行所面臨之各項管理問題，於契約中規定購售雙方需於履約期限內訂期舉辦 4 次合約管理會議，其中第 1 次合約管理會議於承約商原製造廠舉行，第 2、3、4 次合約管理會議假本總臺辦理，會中就契約執行、軟/硬體技術介面、款項支付、文件交付、及其他相關履約、驗收事宜進行綜合性之研商處理；另規劃 1 次雷達系統設計審查會議，於承約商原製造廠舉行，就承約商交付之系統規格文件(SYSTEM SEGMENT SPECIFICATION, SSS)、介面控制文件(INTERFACE CONTROL DOCUMENTS, ICD)、系統測試計畫(SYSTEM TEST PLAN, STP)、技術手冊(Technical Manuals, TM)、維護手冊(Maintenance Manuals)、相關圖說(Drawings and Associated Lists)及備份零組件需求建議清單(Provisioning Parts List)內容進行各項疑點之釐清，以利契約之執行。本購案第 1 次合約管理會議暨系統設計審查會議之執行，THALES 公司於啟始會議建議併案辦理。

二、行程

此次民用航空局飛航服務總臺共選派 4 名人員前往法國巴黎，與承約商 THALES 公司舉行為期 17 天之第 1 次合約管理會議暨系統設計審查會議，行程內容如后：

- 1、99 年 6 月 11 日搭乘中華航空 CI0065 班機，由臺北經荷蘭阿姆斯特丹轉搭荷蘭航空 KL1233 班機，於當地時間 6 月 12 日抵達法國巴黎戴高樂機場。
- 2、99 年 6 月 13 日：適逢星期例假日，無議程安排。
- 3、99 年 6 月 14 日至 18 日：第 1 次合約管理會議。
- 4、99 年 6 月 19 日至 20 日：適逢星期例假日，無議程安排。
- 5、99 年 6 月 21 日至 25 日：系統設計審查會議。
- 6、99 年 6 月 26 日搭乘荷蘭航空 KL1228 班機，由法國巴黎戴高樂國際機場，經荷蘭阿姆斯特丹轉搭中華航空 CI0066 班機，於 27 日抵達臺北。

三、議程

日期	議程內容
6 月 14 日	1. 工廠參訪 2. 專案計畫時程(訓練、工廠測試、陣地架設安裝、陣地測試與飛測)
6 月 15 日	雷達陣地作業審查 1. 高雄雷達 a. ASR-9 雷達拆除 b. 天線與球罩介面 c. 安裝步驟 d. GFE 配合事項 e. 測試 2. 馬公雷達 a. 機房設計 b. 機房完工 c. 安裝步驟 d. GFE 配合事項 e. 測試
6 月 16 日	後勤作業審查 a. 技術文件審查 b. 系統可靠性、可維護性與可用性(RMA)

日期	議程內容
6 月 17 日	備份零組件 a. 高雄馬公終端雷達 STAR2000/RSM970S 與桃園 STAR2000/RSM970S 雷達組件之差異性 b. B Batch 組件審查 c. A0 Batch 組件審查 d. 附加保固
6 月 18 日	教育訓練 a. 初級雷達訓練 b. 次級雷達訓練 c. 陣地強化訓練
6 月 21 日	初級雷達 STAR-2000 規格審查(CDRL-D03) a. 性能(performance) b. 設計(design) c. 限定條件(qualification) d. 文件(documentation)
6 月 22 日	二次雷達 RSM 970S 規格審查(CDRL-D03) a. 性能(performance) b. 設計(design) c. 限定條件(qualification) d. 文件(documentation)
6 月 23 日	介面控制文件審查(CDRL-D04) a. 高雄通信架構 b. 馬公通信架構 c. 雷達陣地介面架構 d. CD2 輸出格式介面
6 月 24 日	1、技術手冊與維護手冊審查(CDRL-D10、CDRL-D11) 2、系統設計審查會議記錄確認
6 月 25 日	檢視會議紀錄並由雙方代表完成會議紀錄簽署

肆、會議結論

一、有關訓練、工廠測試、陣地架設安裝及陣地測試之計畫期程如下：

1、初級雷達國外原廠訓練	2010.07.05-2010.07.16
2、二次雷達國外原廠訓練	2010.08.16-2010.08.27
3、工廠測試	2010.09.13-2010.09.24
4、高雄 ASR-9 雷達拆除及 STAR2000/RSM970S 雷達架設安裝	2011.01.03-2011.06.02
5、高雄雷達陣地測試	2011.04.27-2011.04.29
6、高雄雷達飛測	2011.05.02-2011.05.03
7、高雄雷達信心測試	2011.05.04-2011.06.02
8、馬公雷達架設安裝	2011.07.01-2011.10.18
9、馬公雷達陣地測試	2011.09.12-2011.09.14
10、馬公雷達飛測	2011.09.15-2011.09.16
11、馬公雷達信心測試	2011.09.19-2011.10.18

二、教育訓練之課程內容、訓練時間安排及訓練人數

- 1、Thales 公司原規劃初級雷達及二次雷達原廠訓練課程為 10 上課天，每天上課時數為 6 小時，考量初級雷達國外原廠訓練日期為 7/6 至 7/16 日，且 7/14 為法國國慶日放假，實際上課時間只有 8 天；二次雷達國外原廠訓練日期為 8/17 至 8/27 日，實際上課時間只有 9 天；Thales 同意彈性調整每日上課時數，於訓練期間將所有課程完成訓練。
- 2、為配合高雄終端航管雷達於 5 個月內完成拆架(高雄 ASR-9 雷達拆除及新雷達安裝)之需求，Thales 公司建議初級雷達國內強化訓練(三週)於高雄終端航管雷達架設期間執行，二次雷達國內強化訓練(二週)於馬公終端航管雷達架設期間執行，以免影響高雄雷達架設期程，總臺同意 THALES 公司之建議。
- 3、總臺建議將天線旋轉耦合器(Rotary Joint)之更換及調校、IBIS 之安裝及建構、CBP 安裝作業(包括 CBP-TMR 及 CBP-RSM)、P-line 軟體設定將納入訓練課程範圍。THALES 公司同意配合辦理。天線旋轉

耦合器更換及調校課程將納入二次雷達國外原廠訓練辦理。有關天線旋轉耦合器培林更換部分屬 4 級維護範圍，THALES 公司將與工程部門討論其可行性。

- 4、國內進階訓練及強化訓練課程，總臺請 THALES 公司同意不受最多 8 人之限制，THALES 公司原則同意，建議以維護人員為優先訓練等級。
- 5、國內進階訓練及強化訓練課程，總臺希望錄影供後續內部訓練使用，THALES 公司同意總臺簽署書面資料確認錄影資料僅供內部維護訓練使用後，由總臺負責進行錄影作業。

三、設備交運配合作業事項

- 1、高雄及馬公雷達架設許可申請配合事項：本總臺於 7 月 31 日前將 Thales 必需配合提供之文件內容告知 Thales 公司，Thales 公司於 9 月 30 日前將相關資料提送總臺，以利本總臺向國家通信傳播委員會(NCC)提出架設許可申請。
- 2、設備裝運及馬公雷達架設前倉儲需求配合事項：Thales 公司預計於 99 年 11 月進行所有設備交運，該公司將於 7 月 31 日將所有包裝明細送本總臺確認馬公助航臺是否有足夠的空間可供存放，若本總臺無法提供存放空間，Thales 公司將請次承包商大同世界科技股份有限公司配合在高雄提供儲存空間，要架設時再由 Thales 公司負責運至馬公。

四、測試及飛測作業事項：

- 1、總臺建議 THALES 公司提供關鍵性功能(Critical Item)與測試程序之對照表，以利工廠測試及陣地測試時確認所提供之雷達系統滿足契約需求，THALES 公司配合辦理。
- 2、在工廠測試驗收部分因為無法實際顯示 CD-2 格式之輸出，所以 THALES 公司將提供模擬設備可以讀出 CD-2 格式資料供總臺驗收人員驗證。
- 3、在陣地驗收測試時為實際確認 CD-2 格式，總臺擬將雷達信號引進航管系統(ATMS 測試系統、ATCAS 測試系統、獨立備援系統 IBAS、或 μ -ARTS 系統)中驗證，以確認信號格式是否正確。
- 4、陣地架設期間 Thales 工程師將透過在空機確認雷達性能，並依規定

提供報告給總臺。

5、Thales 公司同意提供飛測機飛測需求範例，由本總臺規劃飛測路線後，向民航局或軍方申請特別飛測需要。

6、Thales 公司負責分析高雄及馬公雷達飛測涵蓋情形，並將報告提送本總臺。

五、雷達機房雙方配合事項：

1、高雄雷達機房作業配合事項：

a. THALES 公司同意提供 2 組 230/400V 之變壓器供高雄雷達機房電力使用，並同意將不斷電系統(UPS)之 status 送至雷達 RCMS 監控。本總臺配合於 8 月 23 日前將高雄雷達 UPS 規格文件送交該公司，監控所需之乾接點接線由本總臺負責佈線。THALES 公司將與次承包商大同世界科技股份有限公司討論確認後，於 7 月 31 日前 ASR-9 雷達拆除及新雷達架設之細步作業程序送本總臺審查。

b. 本總臺負責將雷達設備所需 100A 3 相 4 線之電源佈設至 2 樓雷達機房轉接開關，供 THALES 架設時接用。

2、馬公雷達機房作業配合事項：

a. 為達到主動式避雷針對雷達機房保護效果，THALES 公司建議避雷針長度至少要 2m，與馬公助航臺確認該臺址過去並無淹水紀錄，經細部討論後建議將球罩女兒牆高度由 75cm 降低 40cm，另將 1 樓距地面高度由 1m 調整為 75cm，調整後除可將 2m 主動式避雷針架設於球罩頂外，並可滿足禁限建及天線平臺 350 公尺內不得有建物高於天線平臺之規定，本總臺同意 THALES 於球罩頂安裝 2m 高之主動式避雷針。

b. 本總臺負責將 UPS 電源佈設至 4 樓配電箱(規格為 64A 三相四線)，供 THALES 公司架設雷達使用。

c. THALES 公司同意提供 2 部 230/400V 之變壓器，供馬公雷達機房電力使用，由本總臺交由雷達機房承商配合安裝架設。

d. THALES 公司同意將不斷電系統(UPS)之 status 送至雷達 RCMS 監控。

e. THALES 公司應於 2010/07/31 前將馬公雷達球罩固定模板安裝程序送本總臺，以利本總臺納入雷達機房工程採購案要求承商配合

施工，球罩架設之金屬模板由 THALES 公司負責提供。

六、備份零組件：

- 1、THALES 公司確認桃園雷達使用 STALO units 高雄雷達則採用 Synthetizer units。
- 2、THALES 公司確認新的 MDRP 接收模組已包含 MDR and MMXC 模組，當 MDR 或 MMXC 功能故障時必需整組送修。
- 3、確認高雄新型的 S Band PA driver MES110 可做為桃園 STAR-2000 的備份件，但桃園 STAR-2000 舊型的 S Band PA driver MES110 無法做為高雄雷達的備份件。

七、其他確認項目：

- 1、高雄新初級雷達頻率選用：雙方確認高雄 STAR-2000 使用之頻率為 2750MHz 及 2792MHz。
- 2、THALES 公司原提供之高雄雷達僅具有一個獨立的氣象波道，但若 CHANNEL 切換時則無氣象資料輸出，經過雙方協商後，THALES 公司願意無條件提供給總臺雙氣象波道。關於 ASTERIX 格式中的氣象資料轉換成 CD-2 格式時，因 ASTERIX 格式氣象資料有 6 個 LEVEL 而 CD-2 格式只有 2 個 LEVEL，THALES 公司提供兩個參數用以定義 ASTERIX 格式轉換成 CD-2 格式時的對應 LEVEL 值。
- 3、雷達維護工具：THALES 公司同意提供 1 組黃油加油槍、1 組天線拆卸工具及 2 組吊掛工具供總臺未來維護雷達設備使用。
- 4、二次雷達涵蓋距離：THALES 公司說明 RSM970S 以每分鐘 12 轉運作其 SSR 或 Mode S 涵蓋距離均可達 256 哩。
- 5、THALES 公司說明 IBIS 錄存之雷達信號資料只能透過 IBIS 軟體做播放，無法拷貝至一般電腦利用 DVD 播放器或其他播放軟體進行播放。
- 6、THALES 公司於架設 Transponder 期間時，負責量測 SMS beacon 所在之 GPS 座標，並將測量結果送交本總臺。
- 7、雷達設備架設期間由本總臺負責提供 2 組 Mode A 及 Mode S 電碼供 SMS 安裝設定使用，並分別指定 II Code 供高雄及馬公二次雷達架設使用。
- 8、於雷達架設期間，THALES 公司配合提供更精確的架設時程，以利本總臺安排消防車進行雷達球罩安裝防水測試。
- 9、THALES 公司同意分別額外提供一套 IBIS 系統供高雄及馬公遠端監控席位(RCMS)使用。

伍、心得與建議

本總臺新建置完成之飛航管理系統(Air Traffic Management System, ATMS)已具備處理 ASTERIX 雷達信號格式之能力，惟為滿足其他機關/單位作業需求，本總臺持續提供 CD-2 信號格式介面供外界銜接使用，未來將告知信號接用機關/單位，請其於辦理系統汰換或升級時，適時將雷達信號接用格式轉換為 ASTERIX 格式，以簡化總臺對外銜接之介面。

隨著科技的發展，監視系統(Surveillance system)信號源愈來愈多元化除現用之雷達系統外，尚包括廣播式自動回報監視系統(ADS-B)、多點定位系統(Multilateration)、廣域多點定位系統(WAMS)、全球衛星導航系統(GNSS)等，未來規劃雷達涵蓋備援需求時，可將其他系統納入考量。

陸、附錄

	MINUTES of MEETING		Ref: ARS_PMR#1_SDR/MoM03 Date: June 25 th , 2010 Author: T DELALANDE Approved:
CONTRACT : No. Contract ref. 10-GF3-0002			
DATE : June 14 th - 25 th , 2010		PLACE : THALES, Ymare	
SUBJECT: Program Management Review and System Design Review			
Attendees: Mr. Shun Fa Chen – ANWS, Mr. Chin-Yu Kang – ANWS, Mr. Chun-Tsai Lee – ANWS, Mr. Shang-Tien Tsai – ANWS, Mr. Alistair Falconer – MITRE Corporation, System Engineering / ANWS consultant Mr. Thomas Delalande – THALES, Program Manager, France Mr. Jean Fumeux – THALES, Logistic Manager, France Mr. Hervé Dutheil – THALES, Radar Product Manager, France Mr. Christian Vidal – THALES, Civil Works, France Mr. Patrick Lorot – THALES, Product Engineer Mr. Sylvain Colin – THALES, Product Engineer Mr. Guillaume Cornu – THALES, Product Engineer Mr. Pascal Jezequel – THALES, Product Engineer Mr. Hong-Yu CHEN - TSTI Company Ms. Juan-Juan Min – CY AND Company			
<u>CONCLUSION:</u> Both PMR and SSR have been undertaken. SDR will close when THALES will have closed its actions items due for the 31/07/2010. See action and minutes for details.			
For ANWS		For THALES	
Shun-Fa Chen Program Manager		Thomas Delalande Programme Manager	
<u>Distribution ANWS:</u> Attendees		<u>Distribution THALES</u> Attendees <u>For information:</u>	

The introduction was followed by an Agenda Overview presentation.

A single set of documentation, was made available for use during the meeting that contained all the documentation for which comments were made and all the documentation that THALES has delivered. These were used for discussions and reference during the meeting.

An electronic copy of documents has been handed over to ANWS at the end of the Design Review.

MINUTES of the MEETING

14/06/2010	1. ANWS requests that THALES to follow the contractual requirements to establish a THALES Australia Ltd. Taiwan branch office ASAP to avoid creating unnecessary issues for the contract performance. 2. Training a. Regarding factory site trainings for PSR and MSSR, the original plans made by THALES was 6 hours per day and five days a week for 10 working days per training. For PSR factory training to be scheduled from 04/07/2010 through 18/07/2010, the actual number of days for training is only 8 days, (from 06/07/2010 through July 16 and due to French National Day on 14th). For MSSR factory training, the original schedule was from 15/08/2010 through 29/08/2010, actual number of training days are 9 days (from 17/08/2010 through 27/08/2010). THALES has agreed to make the daily training hours flexible in order to complete all the required training courses to be finished within the limited number of training days. b. According to THALES' bidding proposal, PSR domestic advanced training (3 weeks) will be completed prior to the commencement of Confidence Test of Kaohsiung Radar. The MSSR domestic advanced training (2 weeks) will be completed prior to the commencement of Confidence Test of Magong Radar, in order not to affect the installation (within 5 months) of Kaohsiung Radar, ANWS agrees to the PSR advance training courses to take place during the Kaohsiung radar installation period. c. Regarding the ASR9 radar dismantling and new radar installation in Kaohsiung, it was originally scheduled to take place between 03/01/2011, through 02/06/2011. See enclosure 8 3. ANWS confirms that the frequencies applied and approved by NCC for Kaohsiung PSR to use are: 2750MHz and 2792MHz. THALES confirms that the frequency range is acceptable for operation. 4. ANWS shall apply for installation permit for Magong and Kaohsiung radar in October 2010, in order to allow THALES to apply for import license. THALES will prepare necessary documents prior to 30/09/2010. (ANWS will provide THALES the
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	required documents by 31/07/2010). 5. FAT (from 13/09/2010 to 24/09/2010) FAT will be conducted consecutively, not simultaneously for both Kaohsiung and Magong radar. Spare parts will only be tested on site in Kaohsiung prior to the final acceptance of the system. SGS issues, Taiwanese SGS has confirmed the award of the contract by BoT, THALES is now expecting to receive the point of contact for France offices. ANWS will follow up with the Taiwan SGS to ensure France SGS respond ASAP by 30/06/2010. 6. Sites installation THALES will arrange all shipment in November 2010, including installation parts for Kaohsiung, Magong and all spare parts. The Magong installation parts should be stored with arrangement made at Magong site in order to keep the shipment in good condition, since the radome should be placed inside the building. If ANWS can't find a suitable storage on Magong site, TSTI will take the responsibility to arrange storage in Kaohsiung. THALES is to provide a standard packing list (for each crate), one list for Magong and one for Kaohsiung, for ANWS to check for available storage place by 31/07/2010 or earlier. 7. SAT & Flight Checks - During radar installation, THALES engineers will observe for opportunity flights to ensure the radar performance and provide reports accordingly - THALES will provide to ANWS some flight plans examples for flight inspection by 31/07/2010 - ANWS will arrange with CAA to find a suitable flight route for the check to meet with ANWS's requirements. - Afterwards, ANWS will arrange for a flight check plane from CAA to do the flight check. - THALES will analyse the flight check coverage and provide reports accordingly.
15/06/2010	■ Sites activities Kaohsiung 1. Power requirement - THALES agrees to provide two 230/400V transformers. - ANWS has to install a 100A 3P/4w breaker, the same time with the UPS in the equipment room on the 2nd floor. - THALES agrees to include the two UPS status onto the RCMS control. For such inclusion, ANWS will provide and install the necessary 10 twisted cables from the ground floor to the 2nd floor equipment room.

	d. ANWS will provide THALES the related UPS specifications (with a format similar to Remote System interface example provided, see enclosure 15) by 23/08/2010, prior to the FAT, . 2. ASR9 dismantling The dismantling and installation period originally planned by THALES was for six months, which did not meet the ASR9 dismantling, STAR2000&RSM970S installation and testing requirements in five months from ANWS. After detailed discussions the adjusted period is proposed to commence on 03/01/2010 through 02/06/2011 (after confirmation by THALES by 31/07/2010). In order to match the activities, ANWS will make immediate action to procure UPS for the installation to be completed before THALES engineers start the electronic installation. 3. Interface for antenna & radome All radome & antenna interface data have been provided to ANWS. ANWS has to provide to THALES detailed drawings interface for Magong radar tower by 30/09/2010. THALES will provide a procedure on how to install the template for radome fixation at Magong by 31/07/2010. 4. Installation steps Covered and stated in the previous discussions- see program schedule for details 5. Equipments to be provided by ANWS Only GFE equipments (power supplies through UPS, communication lines) will have to be provided by ANWS. 6. Information to be provided by THALES An installation plan for Kaohsiung will be provided by THALES by 15/07/2010. 7. Test a. Test Readiness Review (TRR) will be held prior to FAT and SAT. b. Prior to commencement of confidence tests, a brief discussion between THALES and ANWS will take place, to cover the testing plans, acceptable status, rejecting status...all related issues. During the confidence test period, THALES representatives will stay on site for the entire period. Daily status check lists will be provided by THALES. Such lists will be signed by both THALES and ANWS representatives each day. 8. UPS with capacity of 60KVA is sufficient. ■ Sites activities Magong 1. Tower design a. ANWS agrees to lower the antenna equipment room space to be 3Mx3M
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	for easy radar installation and maintenance for later. b. It was suggested by THALES that the height of the parapet on the 4th floor to be 90cm, railing to be put on top. c. The protruding structure on the 4th floor entrance will be changed to become a push up door from the ground. d. THALES will provide a 2m ESE lightening rod, and propose to modify the height of parapet for the radome from 75cm to be 40cm (with inserting steel rods being 30cm), the foundation height for the first floor is modified from 1m to be 75cm. A confirmation will be made to THALES, after discussions made by ANWS and its architect by 31/07/2010. See enclosure 6. e. THALES will provide the templates for radome inserting steel rods and the procedures to follow. f. ANWS has to install a 64A 3P/4w breaker, the same time with the UPS in the equipment room on the 4th floor. 2. Site readiness It is estimated by ANWS that the building will be ready by mid 2011. 3. Installation steps THALES agrees to provide two 230/400V transformers. They will be installed by the equipment room contractor. 4. Equipments to be provided by ANWS Only GFE equipments (power supplies through UPS, communication lines) will have to be provided by ANWS. 5. Test a. Test Readiness Review (TRR) will be held prior to SAT. b. Prior to commencement of confidence tests, a brief discussion between THALES and ANWS will take place, to cover the testing plans, acceptable status, rejecting status...all related issues. During the confidence test period, THALES representatives will stay on site for the entire period. Daily status check lists will be provided by THALES. Such lists will be signed by both THALES and ANWS representatives each day. 6. UPS with capacity of 40KVA is sufficient. 7. UPS status will be monitored on the RCMS. UPS used at Magong will have the same specifications as the ones used at Kaohsiung. 8. THALES will provide an installation plan by 31/10/2010.
16/06/2010	■ Review of ILS activities 1. Technical documentation General descriptions presented by ILS manager, no additional requests or special comments were made by ANWS. 2. RMA No additional requests from ANWS.

	3. List of supply: a. THALES will provide one grease injector for ANWS to use for maintenance b. THALES will provide the second weather channel in Kaohsiung. c. THALES will provide one set of handling equipment and 2 keeper pieces. 4. Spare parts a. ANWS requests that THALES to double check the model number of the spare parts provided, in order to avoid any issues at delivery. THALES has provided the revised list ready by 17/06/2010 (see enclosure 11). b. ANWS noticed that the spare parts list provided were showing parts that are not matching with the original STAR2000 used in Taoyuan, this will generate problems while spare parts are not commonly used for Taoyuan and Kaohsiung. E.g. Taoyuan is using STALO units, while Kaohsiung was proposed with synthesizer units. c. The entire set of rotary joint has already included an encoder. Encoders used in Kaohsiung and Magong are different. ANWS will include a dual encoder RSM for Magong in the spare part list for procurement. d. There is no more clutch in the THALES radar design. ANWS wants THALES to give more detailed information on how the mechanism is protected in case of motor driver failure by 25/06/2010. See enclosure 12 e. The new THALES radar has combined motor and reducer into a single module. f. The MDRP receiver has included MDR receiver and MMXC function, when any of the MDR or MMXC malfunctions, the entire board will need to be replaced, instead of replacing a single module. g. According to the contract, RCMS will not include IBIS. h. It is confirmed that S Band PA driver MES110, the power module used for Kaohsiung radar can be used by Taoyuan radar. However, the older version power modules used by Taoyuan radar can't be used for Kaohsiung radar.
17/06/2010	■ Spare options 1. Review on differences between 2005 system & 2010 system Presentations had been made previously; THALES has provided

	the electronic copy to ANWS. 2. Review on B Batch Previously discussed. 3. Review on A0 Batch ANWS will discuss among themselves and provide a list to THALES by 31/07/2010.
18/06/2010	■ Training (factory and on site) a. ANWS requests that all training materials (time schedules & training description) to be provided by THALES – see enclosure 3. b. ANWS requests that replacements of rotary joints, including adjustment should also be in part of the training at factory during MSSR training. c. ANWS suggests that more training on CBP is needed. On day 9 of the schedule, CBP is only one hour. THALES answered that CBP will be utilized during the training from the hands on process during the factory. THALES will add one module of CBP during factory training. d. ANWS requests the replacement of the motor bearings also included in the training. THALES will investigate the possible inclusion of the training from their engineer department, as this is a level 4 maintenance. e. For training in Taiwan, ANWS requests for video recording on hands on training. THALES agrees to this. However, paper will be signed by both ANWS and THALES to allow the usage of video are only for internal use by ANWS. 1. Primary & Secondary training ANWS requests that at least the following topics are also covered during trainings (factory & on site): a. Echo level alignment, training document checked b. AZ alignment, training document checked c. TMR installation and configuration, training document checked d. DPC installation and configuration. training document checked. e. IBIS installation and configuration. Can use the same document to do training, THALES will add this part to the training manual. f. Power module measurement. ANWS advised that fans operation is not monitored by the system, hence unable to find faulty fans easily. THALES indicated that there is training class to calculate the power level of the modules in order to detect the fan workability. Such testing procedures are included in the transmission loopback adjustment manual. g. CBP installation operation, CBP-TMR and CBP-RSM. THALES

	will include the procedures in the training. h. P-lines software setting . In the support document 16_power lines ATCC line configuration. THALES will include the setting in the training. i. Rotary joint installation and alignment. THALES will add this part to the training manual. j. Module replacement, training document checked k. RSM 970 channel phase alignment, training document checked. l. RCMS installation, training document checked. 2. ANWS requests that all critical items per contract to provide evidence of compliance during FAT and SAT, i.e. critical items should be proven using cross-reference table on a check list to ensure THALES radar meets the contract requirements. 3. ANWS requests procedures (what equipment/tools/assistance are to be provided by ANWS, what preparation work required prior to the radar shut down...) and schedules for ASR-9 radar dismantling and new radar installation should be provided by THALES ASAP. THALES will work with TSTI to ensure procedures are in compliance with local regulations. Not knowing the structure of ASR9, THALES will present the regular procedures on dismantling radar. THALES/TSTI will provide the procedures and schedules to ANWS by 31/07/2010. 4. RMA ANWS requests that THALES shall demonstrate system timing and capacity under full load conditions. The presentation has taken place on 21/06/2010, see enclosure 4. 5. ANWS request to have the possibility to have more than 8 people during on site training. THALES agrees on that possibility, THALES emphasizes that operating engineers should have the top priority for the class. 6. Follow-up training during warranty Follow-up training and Standard Maintenance Operation Procedures as described in the contract has to be provided by THALES. 7. Action item from previous meetings The Status of Kick-off meeting and site survey meeting Action Item has been checked and updated. (See enclosure 9) 8. System Overview A system overview of a P+S radar presentation has been done by a product engineer – see enclosure 10 9. Local Support during warranty For practical purpose THALES would prefer to have a French engineer on site for
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	this activity.
21/06/2010	SSS Review – see enclosure 14 1. Timing & Sizing Analyze A presentation of the timing & sizing analyse is done by P. Lorot (see enclosure 4), product Engineer. a. ANWS wants THALES to show how the large and small sectors as defined in TSP105 are covered with the data in the presentation. THALES has confirmed that coverage for RSM970S can be up to 256 Nm with 12 rpm in SSR (Mode A/C) or mode S. b. THALES has indicated that the 500 targets for primary detection capacity are aircraft targets. c. The value for processing delays for MSSR is 2 seconds max. (plus PSR delays of 3/64th for P+S configuration). d. With a MSSR at 12 rpm system, the delay should be around 1/3 of a scan, i.e. 1,7 seconds (this value is not guaranteed under peak load conditions). e. THALES has to check and confirm that Eurocat system (or ATMAS program) can accept a total of 2,234 seconds delay in case of P+S 12 rpm configuration by 31/07/2010. ICAO standard specifies that max delay should not exceed ½ scan. f. For a PSR at 12rpm, max delay is 1,7 seconds with evenly or non-evenly targets (aircraft targets processing). g. THALES confirms that in case of ATCC lines overload, there is a message reported into RCMS. h. THALES will have to clarify how sectors are managed in case of capacity overload by 31/07/2010. i. THALES confirms that the system recovers automatically full functions when monitoring the end of the overload situation. Those reports are available on both SDPT and RCMS. 2. Power Modules ANWS wants to know what are the performances of the system if it works 15/16, 14/16...12/16 modules. THALES will provide Blake charts to show the differences at 16, 13, 12 and 11 modules by 24/06/2010- See THALES clarification n° THA-003 3. Spare parts The specification of SDPT-PC is as follow: - CPU 3GHz - 1 G RAM - 100 G HDD - 15" screen - keyboard/Mouse/CD-writer 4. ANWS's Comments review (See enclosure 2)

	a. ANWS will have to provide the priority list between STM terminals by 23/08/2010. b. In ICD document, THALES has updated (See enclosure 13): - figure 3 to reflect how RCMS is connected to DPC1 & DPC2 - Figure 3 & Block diagram of page 8 to include the 2 STM - Output lines required for North ATS park at Kaohsiung with dual CD2 & Asterix - Magong tower with 1 line in CD2 format and 1 line in Asterix format c. THALES has confirmed that output lines of RCMS are with TCP/IP protocol.
22/06/2010	The review of the comments has been continued – see enclosure 2 THALES confirms that motors provided for both Kaohsiung and Magong are 12 rpm/ 60Hz.
23/06/2010	1. The item MTI reflector has been stated has “not available” in the proposal by THALES. THALES has provided to ANWS an explanation on how this function is performed by the radar. See enclosure 5 - THALES confirms through this document the fact that the flag “PSR beacon” is reported through asterix cat048 format. This report is sent to RCMS (LTM & STMs) and ATCC. 2. Presentation of MSSR system and maintenance displays has been performed by Product Engineer – see enclosure 10 - THALES has confirmed that the recorded videos can only be replayed on an IBIS station 3. THALES will provide the GPS coordinates of the SMS beacons during installation. 4. At the time of the installation ANWS will have to provide for each site 2 Mode A Codes and 2 Mode S codes for SMS-beacon installation. 5. At the time of the installation ANWS will have to provide for each site an II code for MSSR installation. 6. At the time of the installation, THALES has to give a more precise schedule of radome installation to prepare waterproof testing with firestation resources. 7. An update of the time schedule for trainings (factory & on site) and supports has been done by Training Manager. The electronic files have been given to ANWS. 8. THALES has provided to ANWS some investigation ideas for channel switch issues at Taoyuan station. If not fixed, THALES will continue to work with ANWS to investigate. 9. In complement to the list of supply, THALES will provide and

	install 1 additional IBIS per site. 10. THALES has provided to ANWS on electronic file an example of Remote system interfaces to be used for RCMS data base.
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SUMMARY OF ACTIONS ITEMS:

CAA-

1. ANWS will provide THALES the required documents (to be provided to NCC for installation permit for both Magong and Kaohsiung radar) by 31/07/2010
2. ANWS will provide THALES the related UPS (Kaohsiung) specifications by 23/08/2010
3. ANWS has to provide to THALES detailed drawings interface for Magong radar tower by 30/09/2010
4. Confirmation for Magong tower design proposal will be made to THALES, after discussions made by ANWS and its architect by 31/07/2010
5. ANWS will discuss among themselves and provide a list of A0 batch to THALES by 31/07/2010

THALES-

6. THALES will prepare necessary documents for import license appliance prior to 30/09/2010.
7. THALES is to provide a standard packing list for both Kaohsiung and Magong by 31/07/2010
8. THALES will provide a procedure on how to install the template for radome fixation at Magong by 31/07/2010
9. THALES/TSTI will provide the procedures and schedules for ASR9 dismantling to ANWS by 31/07/2010
10. THALES will provide an installation plan for Kaohsiung by 15/07/2010
11. THALES will provide an installation plan for Magong by 31/10/2010
12. THALES will have to clarify how sectors are managed in case of capacity overload by 31/07/2010
13. THALES will provide to ANWS some examples of flight plans for flight inspection by 31/07/2010
14. THALES has to check and confirm that ATMAS system can accept the time delays, as shown in the timing and sizing analyse by 31/07/2010.

Note : SDR will close when THALES will have closed its actions due for the 31/07/2010

ENCLOSURES

ENCLOSURE 1**Agenda of the meeting****ARS for KAOHSIUNG & MAGONG - TAIWAN****SDR – June, 2010**

Place: THALES– Ymare, France
Date : 14th to 25th June, 2010

Agenda

<u>Date</u>	<u>Subject</u>	<u>THALES Participants</u>
14/06/2010	1. Welcome	
	2. Factory visit	T Delalande / C Melgar
	3. Program Schedule	T Delalande
	a-Training	
	b-FAT	
	c-Sites installation	
	d-SAT & Flight Checks	

15/06/2010	1. Sites activities Kaohsiung - a- ASR9 dismantling - b- Interface for antenna & radome - c- Installation steps - d- Equipments to be provided by ANWS - e- Endurance Test	H Dutheil / C Vidal
	2. Sites activities Magong - a- Tower design - b- Site readiness - c- Installation steps - d- Equipments to be provided by ANWS - e- Endurance Test	H Dutheil / C Vidal
16/06/2010	Review of ILS activities - a- Technical documentation - b- RMA	J Fumeux
17/06/2010	Spare options - a- Review on differences between 2005 system & 2010 system - b- Review on B Batch - c- Review on A0 Batch - d- Additional warranty	T Delalande/ C Melgar
18/06/2010	Training - a- Primary training - b- Secondary training - c- Site training	P Jezequel
21/06/2010	SSS: STAR 2000 specification - a- Performance - b- Design - c- Qualification - d- Documentation	P Lorot

22/06/2010	SSS : RSM 970S specification a- Performance b- Design c- Qualification d- Documentation	P Lorot
23/06/2010	ICD a- Kaohsiung communication architecture b- Magong communication architecture c- Radar site interface architecture d- CD2 outputs format	P Lorot
24/06/2010	SDR Debriefing/Préparation of the Minutes	as required
25/06/2010	Conclusion/Signature de Minutes	as required

ENCLOSURE 2**ANWS comments and THALES answers**

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
CDRL: 04 ICD Taiwan Rev	Page 5.	1. Kaohsiung Communication Architecture: May THALES please note that dual Asterix and CD2 connections to South Park are required. The architecture chart needs to be modified to show these connections.	THALES noticed and agreed that 2 additional lines in Asterix format has to be sent to South ATS Park (as for North ATS Park).
CDRL: 04 ICD Taiwan Rev	Page 5.	2. Magong Communication Architecture: ANWS is yet to confirm that dual Asterix and CD2 connections to Magong Tower are required. If so, the architecture chart will need to be modified to show these connections.	Due to output constraints, Magong Control Tower will receive 1 line in CD2 format and 1 line in Asterix format
CDRL: 04 ICD Taiwan Rev	Pages 5 & 6.	3. When CD2 is no longer required: When the CD2 client ATM (IBM) is no longer required, can the communications architecture be easily re-configured to eliminate the need for the Asterix to CD2 converters?	Yes, CD2 converter can be easily deactivate.

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
CDRL: 04 ICD Taiwan Rev	Figure 3, Page 9.	4. Plots & Tracks: It is noted that Figure 3 shows each of the P-Lines outputting two Ethernet lines. One line has 'plots' and the other 'tracks'. Can THALES please advise whether this segregation is best or (given the difference between 'plots' and 'tracks' – see below) is it better to output 'tracks' on all lines and allow the ATM to filter on the required 'track' fields? Would this achieve better input redundancy? Please note additional questions about tracks and plots, below.	This parameter can be configure at radar level during installation depending on control centre requirements. The choices can be: - plot/track - plot/plot - track/track.
		5. Differences between plots and tracks: Can THALES please confirm that plots are the same as and tracks except that the track number, status and speed/heading fields are absent in the plots message.	Yes, a track can also includes some extrapolated plots in case of miss

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
CDRL: 04 ICD Taiwan Rev	Figure 3, Page 9	6. Unmanaged Ethernet Switch & RCMS redundancy: Can THALES please confirm that the ability of the RCMS to report to the STM does not depend on the serviceability of unmanaged switch 2? That is, please confirm that failure of switch 2 would still allow RCMS visibility of the radar site from the STM?	Yes, both switches are independent and redundant
		7. STM priority : Can THALES confirm how the priority is managed between both STM ?	In RCMS database, a priority can be given to each STM terminal
CDRL: 04 ICD Taiwan Rev	Page 11.	8. Protocol Converter configuration changes: Please confirm that the Asterix to CD2 converter outputs, can be easily changed from one protocol to another. That is, swapped from Asterix to CD2, etc.	Yes, hardware remains the same
	Page 11.	9. Converter Asterix /CD2 outputs physical characteristics: Please confirm baud rate for outputs can be 19200 rather than 19600	Yes

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
ICD for Radar Data Outputs, CDRL Number: SE-AST-001.	3.2.2 Page 11.	10. HDLC-UI: Please note that THALES ATM engineers have mentioned that HDLC protocol will need address and control bytes.	Yes it can be configured into CBP parameters
		11. Plot or Track Availability Please note that THALES ATM engineers have requested that both Plot and Track target reports must be available for selection.	Yes, it is available into CBP parameters
	4.3 Page 14.	12. Track Initialisation: Can THALES explain their recommended options?	Choice of parameters can be explained and discussed during tuning by the Installation Engineer
	4.5 Page 18.	13. SSR Code validity and filtering: Can THALES explain their recommended options?	Choice of parameters can be explained and discussed during tuning by the Installation Engineer
	4.6 Page 20.	14. Mode S Code validity and filtering: Can THALES explain their recommended options?	Choice of parameters can be explained and discussed during tuning by the Installation Engineer
		15. ASTERIX Cat 8, Data item I008/036: ANWS request that this data item consist of a sequence of Cartesian Vectors in SPF notation.	THALES confirms that it is SPF notation

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
ANWS experience with the existing STAR-2000 (PSR) at Taoyuan International Airport (TIA). In particular Alarm Failure Status.	Alarm Monitoring of Power Module (MES-1400).	16. Normally the power output of each module is 2kW. If it drops to less than 1kW or fails altogether, the TX system doesn't produce an alarm. That is, an alarm is only produced when total system power drops below the alarm limit. Similarly when a MES-1400 cooling fan fails, the system cannot detect and report any alarms. It is a problem, because a MES-1400 can get very hot and fail.	THALES confirms ANWS's comments. In K&M systems power output is not monitored at MES1400 level but a current measurement is done at transistor level, which is indicative of a problem on output power. THALES confirms ANWS's comments. In K&M systems there is a monitoring of MES1400's temperature, which is indicative of problem on fans.
	The RX change-over switch between channels A and B is not smooth and successful.	17. ANWS suspects the cause may be: a. A RF switch failure, but this cannot be confirmed from the LTM status display. b. An Echo Level problem. Attempts have been made to adjust Echo Level in accordance with the procedure, which involves confirming that the standard value of -107 is apparent. This procedure has been met with varying success.	a- the power supply level may be too low. To be confirmed with on site measurement. THALES will check with reports that has to sent by ANWS. b- THALES will send a procedure on how to perform the echo level configuration.
	No Power Supply alarm indication:	18. a. There is no alarm lamp when the power supply located inside the module in the cabinet has failed. b. Likewise, there is no alarm information about power supply in RCMS.	The new design includes a bite monitoring of the power supply. For Taoyuan system, THALES confirms the ANWS's comments. THALES will provide a procedure to check the level of the power supply by 31/07/2010.
	RX System Alarms.	19. Sometimes the system display DSP I/O TG181 card (module) alarms (CHA or CHB). 20. It has been discovered that a RX system restart (CHA or CHB) can clear the alarm. Consequentially ANWS are unsure whether a genuine failure exists.	ANWS has to provide more information (RCMS daily log, to perform a "test alarm" if possible) to enable THALES to give an analyse.

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
Existing ASR Radar at (TIA).	Speed Variator.	21. The Radar installation at TIA has a speed variator associated with the antenna motor drive. ANWS query whether a similar device is required for KHH and MKG.	No, supply of 12 rpm/60 Hz motors.
ANWS experience with the existing RSM970S (SSR) at Taoyuan International Airport (TIA).		22. Sometimes the system displays that the CORVETTE+BADC card and CAMARO#2 are in alarm in the MMX system (CH1 or CH2). It has been discovered that a MMX system restart (CHA or CHB) can clear the alarm. Consequently ANWS are unsure whether a genuine failure	This problem has been fixed with a change of the design. It now includes a new hardware for signal and data processing (MMXC and DPC-PC).
RSM 970S	Mode S, SSR Range Limit.	23. Can THALES please confirm that both KHH and MKG SSRs can be configured to operate up to 256 Nm range at 12 revs/min?	Yes confirmed
ANWS ARS TSP 105.	The requirement for two IBIS displays at both Kaohsiung and Magong.	24. Paragraph 8.5 describes the requirement for two remote terminal consoles at each of these sites. Likewise there is also a requirement for two IBIS displays at these sites.	2 STM are provided Not included in the BoM- Can be ordered as spares
UPS diagram Supplied.	Dual redundant voltage transformers for both Kaohsiung and Magong.	25. As shown in the UPS diagram ANWS require that the THALES supplied Voltage Transformers are dual redundant.	Agreed

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
ANWS ARS TSP 105.	Appendix A3.1	26. THALES is reminded of the requirement to supply quantity 20 asynchronous/synchronous modems, which are to operate from 110 VAC, 60 Hz mains power. Also note: - the modems are to be capable of 19 inch rack mounting. - In accordance with the system architecture diagrams some are fibre modems and the rest are copper modems.	Noticed
Spare Parts List		27. The list quotes the following Personal Computer (PC) model number: 61386116, but no other details are given. ANWS requests a model description be given.	Std config for SDPT-PC: - CPU 3GHz 1 Go RAM 100 Go HDD keyboard/mouse/CD-writer
Technical Manual Presentation. Page 0-3 of GB 61 110 663 – REV G.	The GRA 2500S generator	28. The presentation gives an option of: - two STALO units, or - two synthesizers units. Can THALES please confirm what is provided?	GRA is equipped with two synthesizers units
PSR Antenna Pedestal		29. In some places the antenna pedestal is described as the EA 2000A and other places as the EA 2000AL. What is the difference between these two descriptions?	Mistake in the document. THALES will provide an update of the documentation by 31/07/2010.
ASTERIX SAC/SIC number.		30. SAC/SIC: Please confirm that SAC/SIC numbers are configurable.	THALES confirms that SAC/SIC parameters can be configured into CBP parameters
ASTERIX UAP		31. Can THALES please confirm that all data items in the UAP can be individually selected/deselected as a global configuration?	THALES confirms that UAP parameters can be configured into CBP parameters
ASTERIX Data item I048/140.		32. ANWS specifies that the time of day must be determined from GPS time.	THALES confirms that the time of day is determined from GPS time (THALES is compliant with Eurocontrol standard)
ASTERIX Cat 8 Disablement		33. Can THALES please confirm that ASTERIX Cat 8 message can be included/excluded as a configuration, through the local PC?	THALES confirms that Asterix Cat8 messages can be configured into CBP parameters

Ref:	Sub: Ref:	ANWS Comment:	THALES Reply:
Antenna Bearing Replacement.		34. Can THALES please provide ANWS with the necessary rotary joint dismantling tools and training to enable expeditious bearing replacement?	Yes included in specific tools and part of the training
Antenna Bearing Maintenance.		35. Can THALES supply a grease injector?	Yes, 1 set
Weather Channel		36. Two weather channels shall be provided.	Yes included and already confirmed in Kick-Off meeting
Primary Radar Frequency		37. 2750 MHz and 2792 MHz shall be used.	Noticed and agreed
KHH ASR-9 Dismantling		38. Procedures for the dismantling and installation of the KHH radar shall be given.	Not requested to be checked with TSTI people
Demonstration of aircraft target capacity.		39. During SDR THALES shall demonstrate system timing and capacity under full load conditions.	See presentation
Rotary Joint Spare Parts.		40. Can THALES please confirm that the spare rotary joint includes an optical encoder?	Yes, it is included
Driver Motor Design		41. Can THALES please confirm if one motor can be replaced while the other one is operating.	The design of motors does not include a clutch anymore. THALES confirms that it is still possible to remove one failed engine without stopping the other one. But for people safety THALES highly recommends to stop antenna rotation
Driver Motor Spare.		42. Can THALES please confirm that the spare Driver Motor includes a Reducer and Clutch?	Due to change of design, the reduced is now part of the motor. The clutch is not anymore part of the motor's design.

ENCLOSURE 3**Revised “Training Schedule for STAR 2000 and RSM 970
Mode S Radar,**

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

ENCLOSURE 4**Timing and sizing analyse**

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ENCLOSURE 5**THALES clarification to ANWS comments to
MTI function****PSR MTI reflector substitute**

Historically speaking, the Primary radar MTI reflectors were introduced to satisfy the following operational function:

On-line monitoring of PSR video alignment with external geographical reference and consequently absence of azimuth deviation along the time,

Mainly introduced when PSR were installed in stand-alone configuration without MSSR.

This feature was useful when radar electronics still contains a lot of analog circuit in the receiving and signal processing channel (more subject to temperature drift along the time than digital technology used nowadays for receiver and signal processing).

- 1) The proposed STAR 2000 and RSM 970S are essentially using digital technology.
- 2) In a co-mounted configuration (PSR+MSSR), antenna assembly (PSR antenna & MSSR antenna) are mechanically linked and tight.
Consequently, the on-line monitoring of both radar alignments with external geographical reference and monitoring of potential azimuth deviation is totally covered by the monitoring of the reply produced by the SMS beacon (Performance Monitoring Transponder in the RFP).
- 3) However, in case of a stand-alone PSR configuration (no Performance Monitoring Transponder delivered), this operational function of monitoring the PSR alignment is totally achieved in modern radar through the function called "Permanent Echo Monitoring"
- 4) The STAR2000 radar performance monitoring function includes a "fixed echo (Permanent Echo) monitoring" function, which allows checking the correct azimuth alignment of the PSR system (including antenna system).
In that purpose, the operator at radar site can enter the coordinates of up to 5 remarkable fixed echoes, present in the radar coverage (natural isolated fixed echo, such as due to a tower or a water tower, visible from the radar site).

The fixed echo alignment monitoring result is reported to the RCMS.

The Radar Processor flags each retained fixed echoe used for alignment monitoring, in order that the radar processing and tracking function does not suppress it.

The flag is reported in the plot/track data sent to the Maintenance Display (RCMS) and to the ATC Centre through asterix cat048

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5) On top of that, the use of permanent natural fixed echos, not subject to failure is much more reliable than any electronic MTI reflector, which are active device subject to failure.

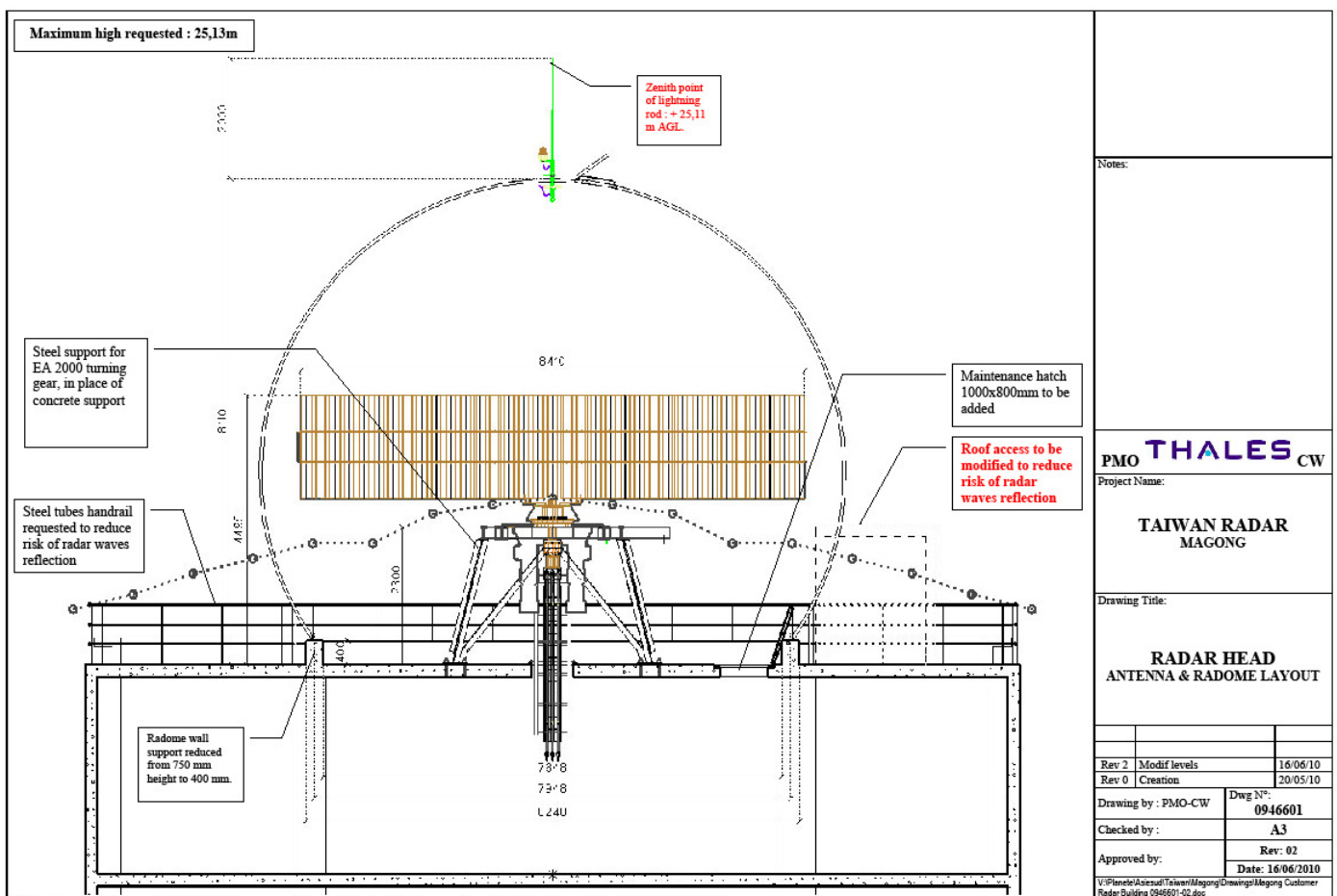
Additionally for Kaohsiung and Magong radar, each configuration includes at least one MSSR with its 2 associated Performance Monitoring Transponders to satisfy the initial operational objective:

“On-line monitoring of radar video alignment with external geographical reference and consequently absence of azimuth deviation along the time”

ENCLOSURE 6

Magong radome design proposal by THALES

See document "Magong Customer Radar Building 0946601-02"



NOTE : In order to be compliant with ICAO recommendation, height of building basement must be reduced from +1,00 m AGL, to + 0,75 AGL

ENCLOSURE 7**Site surveys**

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

ENCLOSURE 8**Program Schedule**

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ENCLOSURE 9

Previous action items

	Item	Description	Response	Processing	Assignee	Status
Kick-off Meeting	20100209-01	The main purpose of the Kick-Off meeting was to give to ANWS's management and engineers an overview of the program.	THALES has presented the main steps of the program to ANWS, see attached pdf files of the presentation made during the meeting.		THALES	Closed
Kick-off Meeting	20100209-02	Program Management	THALES has to send to ANWS a detailed agenda with a tentative schedule for PMR reviews and SDR review. (AI # 20100209-01) The first PMR report will have to be sent to ANWS before the 5th of April.	CAA has received QR #1 on April 9	THALES	Closed
Kick-off Meeting	20100209-03	Supplied Equipment	2 weather channels will have to be supplied since the weather channel has to be independent, as stated in the RFP	confirmed by THALES	THALES	Closed

		Supplied Equipment	Specific tools has to be provided, as stated in the RFP (AI # 20100209-02)	Handling tool - 1 set 2 keeper pieces - 1 set Grease injector - 1 set will be provided with main equipments No Other specific tools are included	THALES	Open
Kick-off Meeting	20100209-04	On Site Activities	THALES has to confirm that the standard frequencies for Primary radar are 2750 Mhz and 2850 Mhz. (AI # 20100209-03) THALES has to provide the last updated version of the Data Handbooks, and to provide radome's dimensions.	2750 and 2792 MHz will be ok to use	THALES/CAA	Closed
Kick-off Meeting	20100209-05	SAT-FAT procedures	THALES to check who can handle the class A inspection according to the contract and the indication of BoT. (AI # 20100209-05)	The class A inspection shall be done by SGS.	THALES	Closed

Kick-off Meeting	20100209-06	Integrated & Logistics Support	THALES has to send two updated detailed lists of the recommended spare parts : 1 for MSSR 1, for P+S. Those lists may be reviewed during the SDR.		THALES	Closed
Kick-off Meeting	20100209-07	Warranty	An on-site engineer that will have to be fully qualified by THALES will handle a local support.		THALES	Closed
Kick-off Meeting	20100209-08	Civil Work	THALES has to provide the last updated version of the Data Handbooks, and to provide radome's dimensions. (AI # 20100209-04)	data files sent to ANWS	THALES	Closed
Kick-off Meeting	20100209-09	Interface with control centre	The detailed scheme of the links to the centre will be part of further technical meeting and/or exchange between ANWS & THALES. A remark has been raised by ANWS concerning the quality of the line at Magong, this point may require some investigation by THALES during the site survey.		THALES/ CAA	Open
Kick-off Meeting	20100209-10	Time Schedule				

Kick-off Meeting	20100209-11	Limit of supply		
Kick-off Meeting	20100209-12	Site Survey	In addition to the schedule for PMR & SDR reviews, THALES has to confirm the possibility to perform the site survey for both radar and cw's activities in week 9.	THALES Open

Site Survey 20100304-01	The first part of the survey has been the visit of the Kaohsiung site. We have been able to access to the electrical room, radar room, storage room, motor room and on the roof. This roof access allowed to take measurements so that a precise report can be made	It was not possible to access to the antenna room inside the radome since the radar could not be stopped during our stay at Kaohsiung. This implies another visit so that the pedestal interface and the radome interface can be measured precisely. Those measures are mandatory since it defines some mechanical parts that have to be specifically manufactured for the installation of the new system. A visit of the control tower has also been possible to check the possibility of the installation of the beacon.	CAA shut down ASR-9 radar on 3/4/2010 00:00:00(L) that THALES Australia can conduct CAA/THA Closed survey on the internal building LES dimension of Kaohsiung Radar.
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Site Survey 20100304-02

The second part of the survey has been the visit to the Magong site. The new site chosen by ANWS has been accessible and it was possible to take measurements so that a precise report can be made.

Closed

Site Survey 20100304-03

The last part of the survey has consists in a debriefing at ANWS Taipei's offices

Mr Christian Vidal has made a brief description of the radome. The estimated weight of the radome is around 1,5 T. The detailed data sheets for the radome will have to be provided by THALES so that ANWS can forward those information to their civil work sub-contractor. It has been noted that the lightning protection on the radome shall be ESE as stated in the RFP. This information will be part of the detailed description of the radome. If the radome's interface of Magong building is made of concrete, then THALES will have to provide the template for radome fixation. Concerning the dismantling of the Kaohsiung's ASR9, it has been specified that the electronics and the aerial equipment will have to be dismantled and repacked carefully by THALES. The radome will not be reused by ANWS.

closed

ENCLOSURE 10

PSR and MSSR presentation

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

ENCLOSURE 11

Spare Parts List

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

Spare parts Option										
Item	Manufacture	Model	Depot Qty	P	S	Magong	Note	Batch ref number	Batch type	TAIPEI 2004 COMMON SPARES
PC for data processing	THALES	61386116	1	x	x			61 995 290	COMMON RECOMM	NO
Pline 8	THALES	61737913	1	x	x			61 995 290	COMMON RECOMM	NO
Single Encoder STAR	THALES	96185191	1	x	NS4S			61115158AB	PRIMARY MANDAT	YES
dual encoder RSM	THALES	61114782	1	x	x					
S BAND MES1400A POWER MODULE	THALES	47081992	1	x				61115158AB	PRIMARY MANDAT	YES
S BAND SYNTHETIZER UNIT	THALES	47068616	1	x				61115158AB	PRIMARY MANDAT	NO
RF SWITCH SW5, 6, 7, 8 AND 9	THALES	47089261	2	x				61115158AB	PRIMARY MANDAT	YES
RF SWITCH SW1, 2, 3 AND 4	THALES	47089262	2	x				61115158AB	PRIMARY MANDAT	YES
STC LNA BOX RF 822 (LOW NOISE AMP)	THALES	47081990	1	x				61995291	PRIMARY RECOMM	YES
REMOTE CONTROL INTERFACE CARD	THALES	47069503	1	x				61995291	PRIMARY RECOMM	YES
S BAND PA DRIVER MES110	THALES	47035817	1	x				61995291	PRIMARY RECOMM	YES
FRONT PANEL CARD (EQUIPPED)	THALES	47104503	1	x				61995291	PRIMARY RECOMM	YES
INTERFACE and SAFETY CARD	THALES	47104505	1	x				61995291	PRIMARY RECOMM	YES
INTERFACE PCB CARD	THALES	47035835	1	x				61995291	PRIMARY RECOMM	YES
DISTR GD UNIT (RCV CHRONOMETRY)	THALES	47068104	1	x				61995291	PRIMARY RECOMM	YES
REFERENCE UNIT RSG2500	THALES	47068302	1	x				61995291	PRIMARY RECOMM	YES
DIGITAL GENERATION UNIT	THALES	47068402	1	x				61995291	PRIMARY RECOMM	YES
S BAND UP CONVERTER UNIT	THALES	47068502	1	x				61995291	PRIMARY RECOMM	YES
GSR SWITCHING UNIT	THALES	47068902	1	x				61995291	PRIMARY RECOMM	YES
RSR SWITCHING UNIT	THALES	47068906	1	x				61995291	PRIMARY RECOMM	YES
S BAND RECEIVER UNIT (RNG GDS)	THALES	47069601	1	x				61995291	PRIMARY RECOMM	YES
RIO BOARD	THALES	46039882	1	x				61995291	PRIMARY RECOMM	NO
PUMA BOARD	THALES	61368340	1	x				61995291	PRIMARY RECOMM	NO
Power Supply 2U	THALES	96182598	1	x				61115161	SECONDARY RECC	NO
HPA Control Module	THALES	47106175	1	x				61115161	SECONDARY RECC	YES
Driver Interface Module	THALES	47106176	1	x				61115161	SECONDARY RECC	YES
SUM HPA Module	THALES	47106174	1	x	x			61115161	SECONDARY RECC	YES
Receiver MDRP	THALES	61371762	1	x				61115161	SECONDARY RECC	NO
TIME STAMPING (NTPS)	THALES	61369261	1	x	x			N/A	ADDITIONAL RECOM	
A0 BATCH THALES	THALES	61115208	1			x	See details in sheet A0 Batch			
IBIS		61 994 499					IBIS			NO
MOTOR REDUCER 12RPM 60Hz		61738062	1	x	x		EA2000NGB			
TRANSPONDER		61 991 656					SMS-2			
DELAY BOARD		47 991 655					SMS-2			
IBC BOARD		61 115 984					SMS-2			
5V POWER SUPPLY		91 788 612					SMS-2			
24V POWER SUPPLY		91 788 613					SMS-2			
ATTENUATOR		91 786 854					SMS-2			

ENCLOSURE 12**THALES clarification to****ANWS comments to
Motor driver Monitoring****Motor Driver Protection**

The motorizations used either with Primary, Secondary or co-mounted radar, the following are the safety protections:

- a too high coupling torque of the motor induces a shutdown of both motors through an “overload” in the antenna cabinet (this may happen for example in case of windy conditions)
- a too high internal temperature of the motors induces a shutdown of the motor that is in “temperature alarm” at the antenna cabinet. The motor remains in free rotation
- An electrical failure of a motor like short cuts induces its shutdown thanks to the circuit breaker 25A located in the antenna cabinet.
- an electrical failure like faulty isolation or current leakage >300mA induces a shutdown of both motors through circuit differential circuit breaker located in the energy cabinet

ENCLOSURE 13**ICD documentation (CDRL 04)**

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

ENCLOSURE 14**System Segment Specification documentation (CDRL
03)**

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

ENCLOSURE 15

Remote System Interface Example

The document is part of these minutes of meeting, a paper copy and an electronic copy are enclosed

Radar Remote Contacts							
Equipment	Ref	Information	Supervision Indication	Colour	Allocated	Checked	Comments
Sample	x y	Info to be displayed on RCMS	open= Value to be displayed on RCMS close= Value to be displayed on RCMS		TBn-n TBn-n		
UPS	1	Mains failure	open= Alarm close= No Alarm			TBC on Site Existing unit	We will require to check existing system on site for outputs
	2	Low battery	open= Alarm close= No Alarm			TBC on Site Existing unit	We will require to check existing system on site for outputs
	3	Bypass active	open= Alarm close= No Alarm			TBC on Site Existing unit	We will require to check existing system on site for outputs
	4	General alarm	open= Alarm close= No Alarm			TBC on Site Existing unit	We will require to check existing system on site for outputs
	5	Generator available	open= Set running close= No Alarm			G&A Barrie Confirmed	No further comment
	6	Genset on load	open= Alarm (but only when ref 10 is in alarm also) close= On			G&A Barrie Confirmed	No further comment
	7	Low fuel level	open= Alarm close= No Alarm			TBC on Site Existing unit	Will require to check existing Generator to confirm that the set has an existing fuel level gauge with clean contacts
	8	General alarm	open= Alarm close= No Alarm			G&A Barrie Confirmed	No further comment
LV Switchboard	9	Mains available	open= Alarm close= No Alarm			G&A Barrie Confirmed	Changed to make Fail Safe
	10	Mains on load	open= Alarm close= No Alarm			G&A Barrie Confirmed	Changed to make Fail Safe
Room Temperature	11	High temperature	open= Alarm close= No Alarm			G&A Barrie Confirmed	Changed to make Fail Safe
	12	Critical temperature	open= Alarm close= No Alarm			G&A Barrie Confirmed	Changed to make Fail Safe
Fire Detection	13	Radar Cabin	open= Fire close= No Fire			G&A Barrie Confirmed	Changed to make Fail Safe
Intruder Alarm	14	Radar Cabin	open= Intruder close= No Intruder			G&A Barrie Confirmed	Changed to make Fail Safe
Air Conditioner 1	15	A/C Operation	open= A/C On close= A/C Off			Thales Confirmed	No further comment
	16	A/C Fault	open= Fault close= No Fault			Thales Confirmed	Changed to make Fail Safe
Air Conditioner 2	17	A/C Operation	open= A/C On close= A/C Off			Thales Confirmed	No further comment
	18	A/C Fault	open= Fault close= No Fault			Thales Confirmed	Changed to make Fail Safe
Air Conditioner 3	19	A/C Operation	open= A/C On close= A/C Off			Thales Confirmed	No further comment
	20	A/C Fault	open= Fault close= No Fault			Thales Confirmed	Changed to make Fail Safe