

**ACQUISITION STRATEGY PAPER**

**FOR**

**Air Traffic Control Beacon Interrogator Replacement (ATCBI‑R) Program**

Approved by: Date:

Director of Communications, Navigation,

and Surveillance, AND-1

Approved by: ­ Date:

Director of Communications, Navigation,

Surveillance, and Infrastructure, ARN-1

­ Submitted By: Date:

Leader, Surveillance IPT, AND-400

**Federal Aviation Administration**

**800 Independence Avenue**

**Washington, DC 20591**

**1. BACKGROUND**

**a. Mission Need**

The ATCBI‑R Mission Need Statement (MNS) (#96) identifies the need to replace Air Traffic Control Beacon Interrogators Models 4 and 5 (ATCBI‑4s/5s) with a surveillance capability that will sustain safe and efficient movement of aircraft. The near‑term deactivation and replacement of ATCBI‑4s/5s has also been reflected in all versions of the National Airspace System (NAS) Architecture. The ATCBI‑R Investment Analysis Team[[1]](#footnote-1) (IAT) has also corroborated this need with extensive cost analyses and supportability studies, and the JRC accepted its conclusions.

Approximately 124 ATCBI‑4/5’s will remain operational after commissioning of all “First Buy” Mode Select Beacon Systems (Mode S) and Airport Surveillance Radar Model 11 (ASR‑11) integrated monopulse secondary surveillance radars (MSSR). Without extensive engineering to replace obsolete parts, many of these secondary surveillance radars (SSR) will be insupportable beyond the year 2000. By that time 100% of the LRUs in these systems will have obsolete parts. Some parts for these beacons are already unavailable and are being re‑engineered. So, by the time replacement systems could begin deployment at the end of 1999, the Federal Aviation Administration Logistics Center (FAALC) will be experiencing a severe shortage of parts needed for repair of the ATCBI‑4s/5s.[[2]](#footnote-2)

The ATCBI‑R Requirements Document has identified a replacement technology consisting of a MSSR with selective interrogation (SI) capability. This system will be upgradeable to include an integral data link capability. Market surveys have validated the feasibility of a Commercial Off‑the‑Shelf/Non‑Developmental Item (COTS/NDI) procurement of this technology. After performing its analysis of alternatives, the IAT recommended and the FAA’s Joint Resources Council (JRC) accepted this replacement solution. Within the FAA, the system will be called ATCBI‑6.

**b. Status**

The Air Traffic Control Beacon Interrogator Replacement (ATCBI‑R) Product Team (PT) developed this initial Acquisition Strategy Paper (ASP) just prior to the Investment Decision reached by the (JRC) on August 12, 1997. This ASP has since been refined to reflect cost figures and schedule milestones baselined at JRC.

**2. OVERVIEW**

**a. Program Scope**

The ATCBI‑R Program consists of a COTS/NDI acquisition of up to 127 secondary surveillance radars (SSR). This total includes 3 support systems to be located at the FAA’s Academy, Depot, and Technical Center, and up to 124 systems at operational sites. The primary and immediate goal of this acquisition is to replace the older generation of SSRs, specifically those ATCBI-4s/5s that are not replaced by the ASR‑11 integrated radar/beacon system. The ATCBI-6 will be installed at existing facilities, primarily on en route sites.

**b. Products**

The ATCBI‑6 will use a monopulse technique for azimuth determination. In addition to continuing to interrogate Air Traffic Control Radar Beacon System (ATCRBS) transponder‑equipped aircraft, the ATCBI‑6 will also be able to selectively interrogate aircraft equipped with Mode S transponders. ATCBI‑6 systems will be software‑driven with respect to channel management, scheduling of interrogations, surveillance processing, calibration, Built‑In Test/Fault Isolation Test (BIT/FIT), and other functions.

Antennas and rotary joints will be provided by subcontractors under the ATCBI-6 contract.

**3**. **FUNDING STRATEGY (See funding figures starting on next page)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **F&E -- Current Year ($M)** |  |  |  |  |  |  |  |  |  |
|  | **TOTAL** | **FY98** | **FY99** | **FY00** | **FY01** | **FY02** | **FY03** | **FY04** | **FY05** |
|  |  |  |  |  |  |  |  |  |  |
| **Facilities and Equipment Costs** | $277.44 | $7.43 | $37.40 | $56.36 | $68.53 | $65.77 | $36.73 | $3.46 | $1.76 |
| Program Office Support | $16.46 | $1.35 | $2.16 | $2.42 | $2.49 | $2.55 | $2.05 | $1.83 | $1.61 |
| Contractor Program Management | $8.98 | $0.64 | $1.58 | $1.62 | $1.67 | $1.71 | $1.75 | $0.00 | $0.00 |
| Contractor Systems Engineering | $9.39 | $0.67 | $1.66 | $1.70 | $1.74 | $1.79 | $1.83 | $0.00 | $0.00 |
| Real Property Improvements | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Pre-Production Systems | $2.85 | $2.85 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Prime Mission Equipment | $159.59 | $1.56 | $21.36 | $30.03 | $43.72 | $41.01 | $21.92 | $0.00 | $0.00 |
| Hardware | $158.81 | $0.77 | $21.36 | $30.03 | $43.72 | $41.01 | $21.92 | $0.00 | $0.00 |
| Software | $0.79 | $0.79 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Interface Development | $21.44 | $0.20 | $2.06 | $9.50 | $4.98 | $3.78 | $0.91 | $0.00 | $0.00 |
| Peculiar Support Equipment | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Common Support Equipment | $9.53 | $0.05 | $1.28 | $1.80 | $2.62 | $2.46 | $1.31 | $0.00 | $0.00 |
| Site Activation | $6.35 | $0.00 | $0.23 | $1.65 | $1.28 | $1.09 | $1.06 | $1.03 | $0.00 |
| Equipment Installation and Test | $11.28 | $0.00 | $0.17 | $1.02 | $3.49 | $4.30 | $2.30 | $0.00 | $0.00 |
| Software Installation and Test | $1.57 | $0.00 | $0.02 | $0.14 | $0.48 | $0.60 | $0.32 | $0.00 | $0.00 |
| Initial Spares | $9.73 | $0.05 | $1.31 | $1.84 | $2.68 | $2.51 | $1.34 | $0.00 | $0.00 |
| Maintenance Training | $0.37 | $0.00 | $0.00 | $0.00 | $0.00 | $0.37 | $0.00 | $0.00 | $0.00 |
| Operations Training | $2.33 | $0.00 | $0.03 | $0.21 | $0.72 | $0.89 | $0.48 | $0.00 | $0.00 |
| Data | $6.10 | $0.00 | $4.85 | $1.24 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Engineering Change Orders | $7.15 | $0.07 | $0.69 | $3.17 | $1.66 | $1.26 | $0.30 | $0.00 | $0.00 |
| Initial Maintenance | $4.33 | $0.00 | $0.00 | $0.00 | $0.99 | $1.45 | $1.14 | $0.60 | $0.15 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **O&M -- Current Year ($M)** |  |  |  |  |  |  |  |  |  |
|  | **TOTAL** | **FY98** | **FY99** | **FY00** | **FY01** | **FY02** | **FY03** | **FY04** | **FY05** |
|  |  |  |  |  |  |  |  |  |  |
| **Operations and Maintenance Costs** | $192.12 | $0.00 | $0.00 | $0.00 | $0.57 | $1.24 | $2.19 | $3.94 | $4.48 |
| OPERATIONS COST | $47.53 | $0.00 | $0.00 | $0.00 | $0.57 | $1.21 | $1.75 | $1.97 | $2.02 |
| Personnel | $18.14 | $0.00 | $0.00 | $0.00 | $0.17 | $0.43 | $0.65 | $0.74 | $0.75 |
| Consumables | $4.96 | $0.00 | $0.00 | $0.00 | $0.04 | $0.10 | $0.16 | $0.18 | $0.19 |
| Energy and Utilities | $21.54 | $0.00 | $0.00 | $0.00 | $0.20 | $0.51 | $0.77 | $0.87 | $0.90 |
| Training | $2.47 | $0.00 | $0.00 | $0.00 | $0.15 | $0.16 | $0.16 | $0.16 | $0.17 |
| Travel | $0.41 | $0.00 | $0.00 | $0.00 | $0.00 | $0.01 | $0.01 | $0.02 | $0.02 |
| Telecommunications | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| SUPPORT COST | $144.60 | $0.00 | $0.00 | $0.00 | $0.00 | $0.03 | $0.44 | $1.97 | $2.45 |
| Personnel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Hardware Maintenance | $28.94 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.31 | $0.78 | $1.18 |
| Software Maintenance | $7.39 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.13 | $0.18 | $0.27 |
| Replenishment Spares | $22.42 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.98 | $1.00 |
| Sustaining Investment | $85.34 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Training | $0.50 | $0.00 | $0.00 | $0.00 | $0.00 | $0.03 | $0.00 | $0.04 | $0.00 |
| Travel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| **Disposition Costs** | $3.12 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| **Total Life Cycle Cost** | $472.69 | $7.43 | $37.40 | $56.36 | $69.10 | $67.01 | $38.92 | $7.40 | $6.24 |
|  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **O&M (continued)** |  |  |  |  |  |  |  |  |  |
|  | **TOTAL** | **FY06** | **FY07** | **FY08** | **FY09** | **FY10** | **FY11** | **FY12** | **FY13** |
|  |  |  |  |  |  |  |  |  |  |
| **Operations and Maintenance Costs** | $192.12 | $4.75 | $9.41 | $9.70 | $9.91 | $10.22 | $10.44 | $10.76 | $11.00 |
| OPERATIONS COST | $47.53 | $2.04 | $2.04 | $2.09 | $2.15 | $2.21 | $2.27 | $2.33 | $2.40 |
| Personnel | $18.14 | $0.77 | $0.79 | $0.81 | $0.84 | $0.86 | $0.88 | $0.90 | $0.93 |
| Consumables | $4.96 | $0.19 | $0.20 | $0.21 | $0.22 | $0.23 | $0.24 | $0.24 | $0.25 |
| Energy and Utilities | $21.54 | $0.92 | $0.94 | $0.97 | $0.99 | $1.02 | $1.05 | $1.07 | $1.10 |
| Training | $2.47 | $0.13 | $0.08 | $0.08 | $0.08 | $0.09 | $0.09 | $0.09 | $0.09 |
| Travel | $0.41 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 |
| Telecommunications | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| SUPPORT COST | $144.60 | $2.71 | $7.37 | $7.61 | $7.76 | $8.01 | $8.17 | $8.43 | $8.60 |
| Personnel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Hardware Maintenance | $28.94 | $1.34 | $1.38 | $1.41 | $1.45 | $1.49 | $1.52 | $1.56 | $1.60 |
| Software Maintenance | $7.39 | $0.30 | $0.31 | $0.32 | $0.33 | $0.33 | $0.34 | $0.35 | $0.36 |
| Replenishment Spares | $22.42 | $1.03 | $1.05 | $1.08 | $1.11 | $1.14 | $1.17 | $1.20 | $1.23 |
| Sustaining Investment | $85.34 | $0.00 | $4.64 | $4.76 | $4.88 | $5.01 | $5.14 | $5.27 | $5.41 |
| Training | $0.50 | $0.04 | $0.00 | $0.04 | $0.00 | $0.04 | $0.00 | $0.05 | $0.00 |
| Travel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| **Disposition Costs** | $3.12 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| **Total Life Cycle Cost** | $472.69 | $4.75 | $9.41 | $9.70 | $9.91 | $10.22 | $10.44 | $10.76 | $11.00 |
|  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **O&M (continued)** |  |  |  |  |  |  |  |  |  |
|  | **TOTAL** | **FY14** | **FY15** | **FY16** | **FY17** | **FY18** | **FY19** | **FY20** | **FY21** |
|  |  |  |  |  |  |  |  |  |  |
| **Operations and Maintenance Costs** | $192.12 | $11.34 | $11.58 | $11.94 | $12.20 | $12.58 | $12.85 | $13.25 | $10.22 |
| OPERATIONS COST | $47.53 | $2.46 | $2.53 | $2.60 | $2.67 | $2.74 | $2.82 | $2.89 | $2.20 |
| Personnel | $18.14 | $0.95 | $0.98 | $1.00 | $1.03 | $1.05 | $1.08 | $1.11 | $0.85 |
| Consumables | $4.96 | $0.26 | $0.27 | $0.28 | $0.30 | $0.31 | $0.32 | $0.33 | $0.26 |
| Energy and Utilities | $21.54 | $1.13 | $1.16 | $1.19 | $1.22 | $1.25 | $1.28 | $1.32 | $1.01 |
| Training | $2.47 | $0.10 | $0.10 | $0.10 | $0.10 | $0.11 | $0.11 | $0.11 | $0.07 |
| Travel | $0.41 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.02 | $0.03 | $0.02 |
| Telecommunications | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| SUPPORT COST | $144.60 | $8.87 | $9.06 | $9.34 | $9.53 | $9.83 | $10.04 | $10.35 | $8.01 |
| Personnel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| Hardware Maintenance | $28.94 | $1.65 | $1.69 | $1.73 | $1.78 | $1.82 | $1.87 | $1.92 | $1.47 |
| Software Maintenance | $7.39 | $0.37 | $0.38 | $0.39 | $0.40 | $0.41 | $0.42 | $0.43 | $0.44 |
| Replenishment Spares | $22.42 | $1.26 | $1.29 | $1.33 | $1.36 | $1.40 | $1.43 | $1.47 | $1.13 |
| Sustaining Investment | $85.34 | $5.55 | $5.69 | $5.84 | $5.99 | $6.15 | $6.31 | $6.47 | $4.97 |
| Training | $0.50 | $0.05 | $0.00 | $0.05 | $0.00 | $0.05 | $0.00 | $0.06 | $0.00 |
| Travel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
|  |  |  |  |  |  |  |  |  |  |
| **Disposition Costs** | $3.12 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.74 | $1.10 |
|  |  |  |  |  |  |  |  |  |  |
| **Total Life Cycle Cost** | $472.69 | $11.34 | $11.58 | $11.94 | $12.20 | $12.58 | $12.85 | $13.99 | $11.32 |
|  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- |
| **O&M (continued)** |  |  |  |  |  |  |
|  | **TOTAL** | **FY22** | **FY23** | **FY24** | **FY25** |  |
|  |  |  |  |  |  |  |
| **Operations and Maintenance Costs** | $192.12 | $5.72 | $1.83 | $0.00 | $0.00 |  |
| OPERATIONS COST | $47.53 | $1.20 | $0.35 | $0.00 | $0.00 |  |
| Personnel | $18.14 | $0.45 | $0.11 | $0.00 | $0.00 |  |
| Consumables | $4.96 | $0.14 | $0.04 | $0.00 | $0.00 |  |
| Energy and Utilities | $21.54 | $0.53 | $0.13 | $0.00 | $0.00 |  |
| Training | $2.47 | $0.07 | $0.07 | $0.00 | $0.00 |  |
| Travel | $0.41 | $0.01 | $0.00 | $0.00 | $0.00 |  |
| Telecommunications | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |  |
|  |  |  |  |  |  |  |
| SUPPORT COST | $144.60 | $4.52 | $1.47 | $0.00 | $0.00 |  |
| Personnel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |  |
| Hardware Maintenance | $28.94 | $0.78 | $0.20 | $0.00 | $0.00 |  |
| Software Maintenance | $7.39 | $0.46 | $0.47 | $0.00 | $0.00 |  |
| Replenishment Spares | $22.42 | $0.60 | $0.15 | $0.00 | $0.00 |  |
| Sustaining Investment | $85.34 | $2.63 | $0.66 | $0.00 | $0.00 |  |
| Training | $0.50 | $0.06 | $0.00 | $0.00 | $0.00 |  |
| Travel | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |  |
|  |  |  |  |  |  |  |
| **Disposition Costs** | $3.12 | $0.91 | $0.38 | $0.00 | $0.00 |  |
|  |  |  |  |  |  |  |
| **Total Life Cycle Cost** | $472.69 | $6.63 | $2.20 | $0.00 | $0.00 |  |
|  |  |  |  |  |  |  |

**4. SCHEDULE STRATEGY**

**Critical Events Objective Dates Ceiling Dates**

Release First SIR 09/16/97 10/01/97

First SIR Down Selection 01/23/98 02/13/98

Release Second SIR 03/10/98 03/27/98

Operational Capability Test Complete 06/02/98 07/29/98

Contract Award 09/01/98 09/18/98

Factory Test Begin 11/02/98 01/18/99

Functional/Physical Configuration Audits 05/6/99 07/16/99

Factory Tests Complete 06/09/99 08/25/99

Production Option #1 Exercised 06/09/99 08/25/99

Deliver System #1 to OT&E Site 05/12/99 07/30/99

Deliver System #2 to Key Site (IOT&E) 06/14/99 08/31/99

Site Acceptance Testing Complete (Key Site) 07/31/99 10/15/99

OT&E Complete 09/13/99 03/30/00

IOT&E Complete 10/14/99 05/12/00

In Service Decision (AAF-1) 10/21/99 06/23/00

Start Deployment 06/10/00 09/01/00

First Site Commissioned (Key Site) 04/15/00 11/15/00

First Production System Commissioned 12/31/00 02/28/01

Organic Depot Established 09/01/03 09/18/05

Last Site Commissioned 10/01/03[[3]](#footnote-3) 09/21/04

**5. PERFORMANCE**

**a. Program Strategy**

The ATCBI‑R PT plans to pursue a COTS/NDI acquisition strategy. Extensive market survey activities have shown that this is a feasible approach: MSSRs with SI capability are available now from two vendors and may be available from more by the time technical proposals are submitted.

The PT has opened dialog with vendors and has posted the draft functional specification on the Internet for industry comment. Comments were received and dispositioned at meetings with each interested vendor. The revised specification was then put out on the Internet again. The Statement of Work (SOW) and Operational Capability Test (OCT) Plan have also been posted on the Internet.

When the PT initiates the formal procurement phase, it will use a 2-step screening process. The first Screening Information Request (SIR) will instruct offerors to submit information which the Source Evaluation Team will evaluate against a set of criteria designed to screen for the most qualified. Much of the information requested will be directly related to the functional specification and the SOW that industry has already seen. Depending upon the number of offerors participating in this initial screening, some vendors will likely be eliminated on the basis of evaluation criteria, thus saving them and the Government the time and resources that would have been spent on full, costed proposals.

The second SIR will request vendors down‑selected from the first SIR to submit a cost proposal. This proposal will be based on a contract tailored to the strengths each remaining vendor has to offer the FAA. In addition, the second SIR will encompass an OCT to be performed at the FAA Technical Center. When proposals and OCT results have been evaluated, a contract for two systems will be awarded to one vendor based on best value to the government. These systems will comprise an Operational (OT) system to be delivered to the Technical Center and a key site system for Independent OT&E (IOT&E)). The contract will also contain options for additional systems to include Depot, Academy, and operational systems beyond key site.

The first two systems will undergo First Article Test (FAT) starting in late 1998. When these systems successfully pass in-plant testing, planned to complete in the summer of 1999, the first production option for 50 sensors will be exercised (the first production system in this lot is expected off the line 12 months later). Following FAT, then, one of the two test systems will go to the Technical Center for OT, while the other will be delivered subsequently to the key site for IOT&E. The key site will be either be a beacon-only site (BOS) or a site where the ATCBI-6 will interface with military Fixed Radar Surveillance (FPS). To some degree, this choice of key site will depend on which of these two site scenarios the winning vendor is best able to accommodate in accordance with the program’s test schedule.

Following OT and IOT&E, Airway Facilities (AF) will issue an In-Service Decision, which is expected to occur at the end of 1999. However, deployment will be dependent on the production schedule and is expected to commence in the summer of 2000. Deployment of systems is expected to complete in the year 2003. Commissioning of systems into the NAS is difficult to predict due to variance in site-specific constraints, but the last ATCBI-6 is expected to commission no later than the end of fiscal year 2004.

Systems will be delivered to as many as 5 terminal sites and 119 enroute sites:



The Air Route Surveillance Radar Models 1 and 2 (ARSR‑1/2), (FPS) and (BOS) interfaces are relatively easy and will be developed first. In general, sites in these configurations will be the first to receive ATCBI‑6 systems. The ARSR‑3 and ARSR‑4 interfaces will be more challenging, and installations at sites in these configurations will be deferred to the latter part of the deployment sequence. The military Ground Radar Navigation (GPN) interface will be developed, as necessary, for GPN sites not covered by the ASR‑11 program.

**b. Management Strategy**

**1. Expanded Product Team** (See table starting on next page)

| **FUNCTION** | **NAME** | **TITLE** | **OFFICE SYMBOL** | **PHONE** | **FAX** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **Program Management** | Herb Goldstein | Product Lead | AND-450 | 202‑267‑5545 | 5124 |
|  | Kimberly Gill | Program Lead | AND-450 | 202‑267‑7836 | 5124 |
|  | Larry Taubenkibel | Technical Officer | AND-450 | 202‑267‑5816 | 5124 |
|  | Sy Karlin | Alt. Tech. Officer | AND-450 | 202‑267‑8458 | 5124 |
|  | Milt Ryan | Business Analyst | AND-450 | 202‑267‑5199 | 5124 |
|  | Viscount Thurston | Prog. Mgmt. Support, Lead | AND‑400 TAC | 202‑267‑8482 | 5124 |
|  | Tom Bradley | Tech. Officer Support | AND‑400 TAC | 202‑484‑2577 | 4420 |
|  | Paula Miller | DM Support | AND‑400 TAC | 202‑267‑8894 | 5165 |
|  | Rob Ridgeway | Data, Financial Support | AND‑400 TAC | 202‑267‑5964 | 5165 |
| **Engineering** | Jim Moe | Lead Engineer | AND-450 | 202-267-9521 | 5124 |
|  | Charles Sloane | Systems Engineer | AND-450 | 202‑267‑9582 | 5124 |
|  | Vincent Chu | Systems Engineer | AND-450 | 202‑267‑5380 | 5124 |
|  | John H. Davis | Lead, Eng’ring Support | AND-400 TAC | 301‑838‑6480 | 6465 |
|  | Malcolm Bohlayer | S/W Support | AND-400 TAC | 301‑838‑6463 | 6465 |
|  | John Meagher | CM Support | AND‑400 TAC | 301‑838‑6451 | 6465 |
|  | Jim Triantos | Sys. Eng’r Support | TRIOS Associates | 301‑982‑1853 | 4223 |
|  | Tim Robinson | Eng’ring Support | TRIOS Associates | 301‑982‑1884 | 4223 |
| **Contracts** | Steve Brown | Contracts Team Lead | ASU-320 | 202-267-7651 | 5124 |
|  | Kim Branch | Contracting Officer | ASU-320 | 202‑267‑8595 | 5124 |
|  | Linda Terhune | CO Admin.Rep. | ASU-320/CEXEC | 202‑267‑3688 | 5149 |
|  | Sheila Johnson | Contracts Support | ASU-320/CEXEC | 202‑267‑7388 | 5149 |
|  | Don Higham | Industrial Eng’r | ASU-210 | 202‑267‑8913 |  |
|  | Tom Marker | S/W Quality | ASU-250 | 202‑267‑8889 |  |
|  |  | QRO | ASU‑220/230/240 |  |  |

| **FUNCTION** | **NAME** | **TITLE** | **OFFICE SYMBOL** | **PHONE** | **FAX** |
| --- | --- | --- | --- | --- | --- |
| **Legal** | T.K. Kiely | Counsel | AGC |  |  |
| **Air Traffic** | Rob Paul | AT Req’ts | ARN-100 | 202‑267‑7045 | 5124 |
| **Test & Evaluation** | William Swanseen | Test Director | ACT-310 | 609‑485‑5047 | 5595 |
|  | Ray Alimenti | Test Lead | ACT-310 | 609‑485‑5378 | 5595 |
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|  | Ed Andrews | Depot Support | AML-200 | 405‑954‑7491 | 3257 |
|  |  | Depot Repair | AML-400 |  |  |
|  | Bruce Johns | Supply Support | AML-630 | 405‑954‑5653 | 4423 |
|  |  | Technical Data | AML-460/AOS-230 | 405‑954‑5180 |  |
|  | Garry Long | AF Training | AFZ-100 | 202‑493‑4067 |  |
|  |  | AT Training | ATR‑100 |  |  |
|  | Buster Alexander | 2nd Level Engineering | AOS-230 | 405‑954‑5180 |  |
|  | Preston Barber | Operational Support | AOS-230 | 405‑954‑5700 |  |
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| **Implementation** | Rajendra Saroop | Implementation Lead | AND-450 | 202‑267‑5199 | 5124 |
|  | Dick Morgan | Impl. Support | AND-400 TAC | 202‑267‑3042 | 5124 |
|  | Khalil Kodsi | NAS Trans. & Impl. | ANS-700 | 202-267-3622 |  |
|  | Guy Hawkes | In-Service Review (ISR) | AOS-100 | 202-267-7489 |  |
|  | Robert Dinh | ISR Support | AOS-100/NISC | 202-646-5568 |  |

**2. Program Control**

A Program Work Breakdown Structure (PWBS) will be used to define all products and outcomes on the program, including both government and contractor responsibilities. A Contract Work Breakdown Structure (CWBS) will be contained within the larger PWBS. The PWBS will be used to expand the integrated program schedule .

The integrated program schedule is constructed as a network logic schedule, i.e. it consists of activities and their predecessors such that critical paths can be determined and monitored. The detailed activities in the schedule support the milestone dates in the Acquisition Program Baseline. Slippage in the supporting activities will be captured through routine schedule monitoring, which will give early warning of potential slips to baselined milestones. Automated program management tools will assist the PT in the comparison of actual to planned cost, schedule and performance. When an activity slips, action plans will be formulated to mitigate potential impact to major schedule milestones.

The program will also use an automated data management system to track and monitor timeliness of both contractor submittals and government responses.

A Detailed Obligation Plan (DOP) will be used to plan expenditures of authorized funds for the ATCBI‑R Program. Allocations for the cost‑reimbursable components of the contract (interface development and site installation) will be closely monitored to ensure that costs will not exceed available resources.

See 5c. (below) for activities that will track the contractor’s progress.

**3. Contract Management**

The ATCBI-6 cover three main types of products and services:

1) production of ATCBI-6 radars and ancillary antennas and rotary joints

on a fixed price basis;

2) hardware and software maintenance on a time and material basis; and

3) cost reimbursable work such as interface development, site preparation, and installation and testing on a cost plus award fee, level of effort basis.

For the fixed price work the PT will evaluate the contractor’s existing cost/schedule/

performance reporting system for acceptability and to ensure that appropriate thresholds and variance controls are in place. For the cost reimbursable, level‑of‑effort part of the contract, an award fee plan will be developed after receipt of proposals , discussed during negotiations, and distributed upon award. The plan will provide the methods and metrics used to determine award fee. The program will require detailed cost reporting and will issue task orders on a short term basis to maintain control of cost and schedule.

The ATCBI‑6 contractor will be required to develop an expanded version of the work breakdown structure (WBS). This expanded CWBS will be baselined at contract award. The contractor will maintain and control the CWBS as the primary framework for contract planning, budgeting, and reporting program cost and schedule status to the Government. After the CWBS is baselined, the contractor will not be allowed to change the CWBS or associated WBS dictionary definitions for any reporting elements identified at Level 3 or above without the approval of the Contracting Officer.

The contractor will be required to conduct Program Management Reviews (PMRs) monthly during pre‑production (contract start‑up, first article testing, and OT&E) and at least bimonthly during full production. At the PMRs the contractor will be required to report, at a minimum, monthly accomplishments, cost and schedule status, technical status, subcontractor status, risks, staffing problems, and priority issues for the next reporting period.

The contractor will also be required to participate in technical and program conferences, meetings, reviews, audits, and evaluations with the ATCBI‑R PT to discuss program progress, identify potential problems, resolve identified problems, and to discuss disposition of problem resolution activities. Formal meeting agendas and data/ documentation (CDRL) deliverables pertaining to the meetings, program, or technical issue under discussion will be required of the contractor. Distribution of minutes will be required within one week of the meeting. Action items will be jointly tracked by both the contractor and the government, with suspense date, and status of the action taken reported at mutually agreed upon intervals, such as at PMRs.

The contract cost and schedule requirements will be monitored at Level 3 of the CWBS.

The PT will utilize the AND‑400 Surveillance IPT Technical Assistance Contract (TAC) support contractor to augment its effort to contractually control and manage the ATCBI‑6 production contract. The Surveillance TAC is a multi‑year, level‑of‑effort contract, utilized to provide specialized expertise and support to the six product lines under AND‑400’s cognizance.

**4. Requirements Management**

The requirements contained within the APB were used to form the basic foundation for the ATCBI-6 system specification. A traceability matrix maps the requirements in the specification to the APB requirements. The System Specification has been distributed for FAA wide review via a clearance record per AMS guidance. Given the benign nature of the comments received through this process, the ATCBI-6 Product Team (PT) plans to baseline the specification prior to SIR-1 release. Upon baselining, the specification will be under the control of the Surveillance and Weather IPT Configuration Control Board (CCB). If a change to the system specification is proposed by any core or extended team member of the PT, regardless of the rationale behind the change, the PT will decide whether or not the change is worthy of consideration by the CCB. If the PT decides not to go forward to the CCB, the reason for disregarding the proposed change must be documented. If the team does go forward with the proposed change for CCB approval, the team must be prepared to discuss whether or not the change fits within the cost, schedule, benefits and requirements baselines set in the APB. If the change increases the benefits associated with the program, it is especially important that this information be briefed to the CCB, especially if the increased benefits exceed the increased cost. The CCB will make the final decision with respect to the implementation of the proposed change or decide that the PT needs a JRC decision to re-baseline the program.

In the case of Interface Requirements Documents (IRD), the Surveillance and Weather IPT CCB will have control of IRDs between Surveillance and Weather systems in the same manner as the ATCBI Specification is described above. IRDs between the ATCBI-6 and automation systems will be under the control of the NAS CCB. The Product Team will decide (as described above for System Specification proposed changes) whether to bring a proposed IRD change to the NAS CCB for consideration.

Upon Contract Award, a Product Team Configuration Control Board (PTCCB) will also be established to help facilitate the process by which the team decides to take proposed specification and IRD changes to the NAS or Surveillance and Weather IPT CCBs. Additionally, this PTCCB will track changes to ensure they are successfully implemented by the contractor. In the event that a request for a proposed change is denied for the time being by any of the three aforementioned CCBs, but should be revisited at a later time, it is the responsibility of the PTCCB to ensure the revisiting happens in the time frame and under the conditions set forth by the CCB in question.

In general, site specific requirements are not anticipated to influence the system specification or IRDs. Site specification requirements are generally installation considerations (e.g. RF and interface cable lengths) not performance considerations. Site specific installation requirements are being handled under a CR LOE site preparation and installation contract. This work will be closely monitored by a Contracting Officer’s Technical Representative (COTR), sometimes referred to as a Technical Officer (TO). The COTR will also be supported by a Technical Officer’s Representative (TOR).

**5. Risk Management**

The overall risk management philosophy for the ATCBI‑R Program is to manage risk as an iterative process, because new risks will be identified throughout the life of the program. A Risk Management Plan (RMP) will be written and maintained by a risk manager as determined by the PT. As risks are identified and assessed, contingency plans will be formulated and implemented. The risk of an undesirable event occurring can only be mitigated if the contingency plan is activated in a timely manner. Therefore, the RMP will include milestones and update rates that are synchronized with contingency plan activation requirements. As risks are overcome and new risks emerge, the plan will be updated.

The risk management plan will be composed through interviews with experts in the fields of secondary surveillance, logistics support, contract support, integration and test, program management, and others as required. It is the responsibility of all PT members to implement and keep the RMP current. When a new risk is identified or a standing risk is eliminated, the risk manager must be provided the information necessary to update the plan. Action items to mitigate risks identified at monthly PT meetings will be assigned and tracked to closure.

As contractors are introduced to the program, their ability to identify, assess and mitigate risk will also be considered, because the risk management skills of the contractors involved with the program directly affect the overall risk associated with the program. PMRs with the contractor will identify potential deviations in cost, schedule and performance requirements and formulate “get well” plans to rectify the projected deviations.

The primary cost, schedule and technical risks and the strategies that will be used to mitigate each are described in the following sections.

5.d.1 Technical Risk ‑ The ATCBI‑R acquisition is 90% non‑developmental. The only development that will be tolerated is that associated with interfaces to equipment such as antennas, rotary joints, primary radars, automation systems, NAS Infrastructure Management System (NIMS), and monopulse test equipment. The core interfacing capability of the ATCBI‑6 will reflect industry standards, such that the risk associated with interfacing to future NAS equipment will be low. Engineering changes to proposed equipment will be considered only if the change is assessed to have low technical risk and the requirement to be fulfilled by the change is critical to the NAS.

See Table below for a description of the primary technical risks and associated mitigation strategies as identified by the PT to date. Because the interfaces are the riskiest technical area, the risks identified with each interface will be addressed in the Risk Management Section of the Integrated Program Plan (IPP).

5.d.2 Schedule Risk ‑ Although the requirements for the core capabilities of the system are known, some requirements associated with NAS interfaces are "moving targets". Coordination must be maintained with other product teams upgrading and replacing both primary radar and automation systems. The procurement, delivery, and installation of government equipment must also be monitored closely to ensure all ancillary equipment (antennas, rotary joints, etc.) required for complete installation and test is available to the contractor. See table below for a list of schedule risks and mitigation strategies that have been identified by the PT to date.

5.d.3 Cost Risk ‑ The cost of the Program is based upon vendor quotes, analogies to similar programs and standard cost estimating practices. A market analysis was also conducted to verify product availability to ensure that competition would keep costs reasonable. The ATCBI‑R PT includes expertise in the procurement of secondary surveillance radar. Since the entire PT was afforded the opportunity to participate in costing the program, the overall cost risk is considered low. See table below for the cost risks and mitigation strategies identified by the PT to date.

|  |  |
| --- | --- |
| **Technical Risk/ Assessment** | **Risk Mitigation Strategy** |
|  |  |
| **Interface Development**‑ The ATCBI‑6 will be required to interface with existing and future automation systems as well as all primary radars collocated with the ATCBI equipment to be replaced with ATCBI—6. Some vendors may not have experience with known interfaces, while none have experience with those interfaces which are not yet defined. |  A Cost Reimbursable Contract with an award fee incentive will be administered with respect to interface development to provide the contractor with the motivation to do the “homework” required to develop all ATCBI‑6 interfaces without introducing undue schedule risk to the program.   The RMP will address all risks associated with each individual interface and provide an action plan to mitigate each one.   The contractor’s software engineering and development process will be evaluated to ensure an adequate process is in place.   Interfaces will be due for delivery in an order corresponding to technical difficulty. The least difficult interfaces will be built first, providing the contractor more time to develop the more difficult interfaces.   Operational tests will be conducted for all interfaces prior to fielding them. |
| **NDI Products will not meet 100% of the FAA’s requirements for the basic ATCBI‑6 system** ‑ Only 1 vendor has built a MSSR with selective interrogation capability for the FAA. Other vendors have provided similar systems to other countries, but it is uncertain whether or not those countries maintain the same requirements as the FAA. |  A market survey was conducted to ensure vendors have products available to meet the critical requirements for an ATCBI‑6 product suitable for the NAS.   The acquisition strategy calls for progressive screening of vendors. Following the evaluation of vendors’ responses to the initial SIR, qualified vendors will respond to the RFO with tech/cost proposals and bring systems to the FAATC for OCT.   Prior to a full parts procurement for all production systems, a performance acceptance test (PAT) will be conducted at the factory to reduce the risk that engineering changes will be required to the system that will affect the parts procurement or severely impact the system design.   Changes will not be made to the NDI system unless they are deemed critical to the safety and efficiency of the NAS. |
| **Product Maturity-** The Product Team must be careful to buy a product that is mature enough to provide stable performance, but not so mature that parts obsolescence causes supportability problems. | 1. The Product will be evaluated for both design stability and parts obsolescence. The funding profile for this program includes funding for engineering changes that may be necessary to re-engineer obsolete parts. Furthermore, the operations costs estimated for this program included funding for technology enhancements. |
| **Supportability**‑ Data rights may be too expensive to be cost beneficial for the FAA to procure for the purpose of an organic dedicated repair service. |  The contract will be structured such that the contractor provides 5 years of both hardware and software maintenance. Two one year options will also be available to extend these services. Prior to the completion of the last option, the FAA will have to decide whether or not it’s in the best interest of the government to transition to an organic depot. |
| **Manufacturing Capabilities** ‑ The risk that the production line of the vendors will not be adequate to generate a quality product in a timely manner. |  Vendors not meeting ISO-9000 standards will not be considered for this procurement.   Past performance will be considered during evaluation of vendor capabilities.   Factory Acceptance Tests will be conducted on production units and a quality assurance plan will be generated and monitored by the FAA. |
| **Schedule Risk/ Assessment** | **Risk Mitigation Strategy** |
| **Schedule Slip** ‑ The risk that schedule slips will adversely affect program costs. | 1. An award fee will create the incentive for the contractor to get the job done in a timely and cost-efficient manner. 2. The cost‑reimbursable part of the contract will give the government the flexibility to make schedule changes without incurring claims for equitable adjustment. |
| **Funding deferred or inadequate**—The program is fully supported by AF and AT sponsors, yet FAA funding is suffering major cutbacks which may put deployment need date at risk. | 1. The PT will readjust acquisition strategy as necessary to get the ATCBI‑6 systems to the field by 1999 (key site). However, more schedule, cost and technical risk will be imposed on the program if funding is not provided as necessary. The PT will replan as necessary in response to funding shortfalls. |
| **Automation/Primary Radar upgrades and replacements**‑ if the interface to automation and/or primary radar is unavailable during installation a delay may result |  Liaisons will be assigned to detect changes in interface plans and to ensure contractor is provided with most current configuration of interfacing subsystem. They will report status on at least a bimonthly basis .   Cost Reimbursable contract with incentives for installation and interface work will mitigate the schedule risk. |
| **Cost‑Reimbursable site preparation, installation and interface development**‑ Contractor may "stretch out" these efforts to make more money. |  An incentive fee will be awarded if the contractor's contractual obligations are completed within a set amount of time.   30% of the payment for prime mission equipment will be withheld until satisfactory installation and checkout of the system is complete. |
| **Unavailable Government Equipment**- If government equipment required to complete equipment installation and test is not available, the schedule may be delayed. |  PT is attempting to minimize government equipment requirements.   Government test and installation equipment is currently being identified and plans for its availability are being generated..   Government equipment will be directly shipped to the facility from the vendor whenever possible to meet the Prime Mission Equipment (PME) delivery schedule.   Program analyst is assigned to program to ensure timely equipment delivery from suppliers to the logistics center as well as from the logistics center to the sites.   An implementation lead will regularly update integrated equipment delivery schedules and coordinate as appropriate with all parties involved. |
| **Access Time** ‑ The contractor may not be able to get downtime required to test the system in time to keep the installation and check‑out schedule. |  The TOR handbook will provide an installation schedule such that early coordination with Air Traffic may facilitate availability of antenna for testing.   An installation kick‑off meeting will reiterate down‑time requirements.   The implementation lead will be required to identify problems with downtime through coordination with the Regional Associate Program Managers (RAPM).. |
| **COST Risk/ Assessment** | **Risk Mitigation Strategy** |
| **Funding Requirements exceed estimated funding profile** |  15% of estimated PME costs are funded for Engineering Change Orders to mitigate technical risk.   PT was involved in costing the program.   FAA determination of funding requirements supported by a company highly experienced in the field of cost estimation. |
| **Funding deferred ‑** The impact of funding deferral is directly related to how much and how long it is deferred. | 1. Sponsors are convinced of the necessity of the program, but the overall FAA budget situation may cause the program to be delayed. The PT is currently working on securing budget as necessary to keep the budget profile valid. |
| **Cost—Reimbursable site preparation, installation and interface development**‑ Contractor may "stretch out" these efforts to make more money. |  An award fee will be awarded if the contractor's contractual obligations are completed within a set amount of time.   30% of payment for PME will be withheld until satisfactory completion of installation and checkout at the site. |

**c. Procurement Strategy**

**1. Sources**. Market survey activities have identified 5 vendors who may qualify for this procurement. No Qualified Bidders List will be used, but vendors will be qualified through the screening process.

Small and disadvantaged businesses will be able to participate by teaming with a prospective prime contractor.

**2. Source Selection.** This is to be a competitive procurement under which the Source Evaluation Team has the opportunity to down-select offerors before an OCT and full proposals are requested. AND - 400 is the source selection official.

**3. Competition.** Four prospective ATCBI‑6 vendors have already shown their interest in this procurement by participating in a market survey effort that included an extensive questionnaire, vendor presentations, and site visits. Another vendor has indicated interest after the site surveys. Results indicate that there will be at least 2 vendors competing and possibly more.

**4. Contract Type*.*** Firm Fixed Price (FFP) Production and Cost‑Plus, Award Fee (CPAF) for maintenance, interface development, site preparation, and system installation. In the procurement of production systems, FFP presents the least risk to the government. FFP can be high‑risk to the contractor, but that risk is minimized since the FAA is buying NDI systems. The use of Award Fee as an incentive will help the PT meet the following requirements: 1) interface development[[4]](#footnote-4), 2) site preparation, installation, and testing, 3) hardware and software maintenance, and 4) studies. These provisions will have a basic term of 5 years and may be extended by 3 one-year options. Time and materials provisions will be utilized for hardware and software maintenance. This type is appropriate due to the indefinite nature of the work.

The PT anticipates buying up to 150 production systems after testing. Due to funding constraints and to provide flexibility, the PT anticipates using two firm options of 50 and an Indefinite Quantity - Indefinite Delivery for 50. Assuming availability of funds at the levels baselined at the FAA’s Investment Decision on ATCBI-R (8/12/97), delivery will take place over a five-year period. We anticipate three one-year options to extend the term of 5 years.

We also anticipate using a provisioning clause for spares, special tools, production of interface hardware and software, and, when the FAA takes over software maintenance, a Program Support Facility (PSF).

**5. Government‑Furnished Property/Information*.*** Some antennas and rotary joints needed for the ATCBI‑6 system will be provided from FAA inventory for the contractor to install. The balance of antennas and rotary joints will be procured under the prime contract. (Modems will be provided by the Communications branch, AOP‑400, of the FAA.)

**6. Acceptance Criteria.** Acceptance of the ATCBI-6 sensor will take place after factory acceptance test as defined in the Master Test Plan . A field test will also be performed at the site under the cost section of the contract in accordance with the Master Test Plan . The Master Test Plan will be tailored to each offeror's NDI approach prior to issuance of the Request for Offeror.

**7. Warranties and Data Rights.** The PT does not plan to acquire warranties.

Requirements for data rights and software licenses will be tailored based on each offeror’s NDI approach. The tailoring will be completed prior to issuance of the Request for Offer. At a minimum, the PT will obtain the rights and software licenses necessary for the FAA to maintain and operate the system.

**8. Funding.** Based upon the analysis that shows the optimum ordering amount is 50 unit and the funding profile, it will be to the FAA's advantage to obtain approval to use Multi-Year funding. Such approval would allow all nonrecurring cost to be amortized over the 50 units and would reduce the total number of parts procurements. Ordering 50 and utilizing an unfunded termination liability of no more than $10.0M would save approximately $125k per unit (or $15.9M on 127 units) compared with buying units in lots of 20. Approval of this plan will constitute the team’s authority to make multi-year funding decisions on an unfunded termination liability of up to $10M.

**6. BENEFITS**

During development of the ATCBI-R Cost Benefit Analysis, a benefits/cost model was developed by the PT using projected costs and benefits for various alternatives. The benefits methodology was structured such that the majority of the program benefits are accrued with each system commissioning. Benefits are accrued in the areas of cost avoidance, controller productivity and decreased delays. Therefore, as a system is commissioned, the program will be given credit for benefits estimated (as dollars) in accordance with the Cost Benefit Analysis for the selected replacement alternative. If ADS-B architecture costs are avoided by this program, these benefits will be allocated to the program when contract costs for an ADS-B ground station become available.

**7. PHYSICAL INTEGRATION**

**a. Real Estate**. The Contractor will be responsible for obtaining all licenses, permits or rights of way necessary to enable installation of the various components of the ATCBI‑6. The contractor will also provide a description of any required land or right‑of‑way acquisition, including but not limited to, a survey, plot description and ownership information adequate to permit the Government to negotiate any necessary land rights.

**b.** **Space**. Existing buildings or shelters that currently house ATCBI‑4s/5s will be used to accommodate the beacon system that replaces the beacon interrogator currently in use. A few sites may require shelters to accommodate the replacement beacon system before the old system is decommissioned. Such shelters will be acquired as necessary.

**c. Environmental**. The Contractor will be in full compliance with the governing Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) directives related to the handling/removal of hazardous material. Removal of asbestos or other materials deemed to be a health hazard which are present at any installation location, will be accomplished only after all precautions called out in the appropriate directives have been observed.

**d. Employee Safety and Health**. The Contractor will observe all OSHA and other pertinent safety regulations governing the installation and/or removal of the beacon interrogator systems being delivered or removed.

**e. Security**. The Contractor will comply with all security requirements imposed by Federal and/or local authorities. Provisions contained in directives which pertain to obtaining security clearances, badges, card keys or other measures necessary to permit regular access to FAA facilities will be followed by the Contractor. This includes requirements for display of personnel badges, vehicular flags and warning lights within the site area or surrounding environs, and requirements for liability insurance. The Contractor will ensure compliance with National security requirements and provide the protection necessary to prevent loss of, or damage to, both Government and Contractor owned property. Similarly, any information and/or communication of a sensitive or proprietary nature, will be safeguarded by Contractor personnel.

**f. Energy Conservation**. The ATCBI-6 will comply with energy efficiency standards described in the applicable sections of the “Energy Policy and Conservation Act” and FAA-STD-033.

**g. Heating, Ventilation, Air Conditioning (HVAC).** Existing facilities that will be used to house the replacement beacon interrogator system will have sufficient HVAC to support the operation of the replacement system upon commissioning. These facilities will also have sufficient HVAC to support simultaneous operationof both the replacement and original systems for limited periods of time during the transition period.

**h. Grounding, bonding, shielding, and lightning protection**. Ground level and below ground lightning protection, grounding, bonding and shielding will be in accordance with FAA Order 6950.19 and FAA STD 19b.

**i. Power Systems and Commercial Power.** The contractor will use commercial or other available power sources at the individual sites for the replacement beacon interrogator system. The power sources must be in compliance with NFPA-70-1996 and FAA-C-1217E. These power sources must also be able to support simultaneous operationof both the replacement and original systems for limited periods of time during the transition period.

**j. Telecommunications.** The contractor will use the existing facility telecommunications infrastructure to the maximum extent possible to support the operation of the replacement beacon interrogators. Any additional telecommunication requirements will be in compliance with ICAO international standards, Annex 10.

**k. Cables.** The contractor will identify cable, cable routing, and raised floor requirements and evaluate each site's characteristics regarding these requirements during the site surveys. The contractor will determine distances between interconnected equipment components and power supplies. The contractor will inspect the cables at each site during the site surveys and determine the adequacy of available cables or justify the need for additional cables. The cabling will comply with FAA-E-2734.

**l. Disposal and Disposition.** A site survey will be conducted by the ATCBI-6 contractor prior to removal and transfer/disposal of existing beacon interrogator systems. A Contractor Site Engineering Report (CSER) will be prepared within one month after the completion of the site survey. The CSER is forwarded to the FAA for review and any changes recommended by the FAA will be incorporated in a final CSER that is submitted to the FAA. Removal/disposal of existing beacon interrogator systems will commence after the final CSER is approved by the FAA. The removal process takes approximately two weeks to accomplish.

**8. FUNCTIONAL INTEGRATION**

8.a. Integration with the Existing NAS

The Secondary Surveillance Radar function has been a critical NAS service for over 30 years, which means the ATCBI-6 will not be integrating a new surveillance function into the NAS. However, there are two activities which must occur in order for a COTS/NDI Product to provide the NAS with a useable system for replacement of the systems currently providing this function (ATCBI-4/5). First, it is highly improbable that a company with no experience building MSSRs for the FAA will meet one hundred percent of the performance and functional requirements identified in the FAA’s ATCBI-6 specification. Therefore, such a contractor’s system design would have to adapt to the needs of a new customer. System enhancements and/or modifications may be required in order to achieve this adaptation to the NAS. Secondly, interfaces to NAS equipment (Primary Radar and Automation Systems) are not expected to be COTS/NDI. These interfaces must be developed in a timely manner to accommodate system deliveries to operational sites.

Additionally, coordination with all organizations and facilities that will be involved with the replacement activities must be conducted in an efficient manner to ensure successful implementation of the program.

8.a.1. NAS Adaptation

Exposing COTS/NDI Product shortfalls with respect to the ATCBI-6 Specification begins during the first screening information request (SIR 1) as described in section 5a. Program Strategy. COTS/NDI Product Functionality and Performance will be verified during the OCT which occurs in the second screening information request (SIR 2). Operational shortfalls (including critical remote maintenance monitoring parameters) identified during both SIR 1 and the OCT may be corrected by the contractor after contract award. A FAT will be conducted prior to the acceptance of the two pre-production systems. This FAT will provide formal verification (under the contract) of the NDI/COTS product’s capability to meet all specifications, including resolution of previously identified shortfalls. Prior to delivery of the pre-production systems to the FAATC for OT and to the Key Site for IOT&E, the contractor will perform regression testing as necessary to ensure that any shortfalls remaining after FAT have been addressed, i.e. that all FAA requirements in the ATCBI-6 specification are met.

8.a.2. Interface Development

Interfaces will be developed in the order of “easiest” to “most difficult”. The ATCBI-6 Product Team is in agreement that this is the most efficient way to get systems fielded as soon as possible. Design Reviews will be conducted for each interface developed. The interface to the HOST and DARC enroute automation systems will be the first interfaces developed as the ATCBI-6 Product Team was able to successfully define this interface in the ATCBI-6 Specification. This interface will be developed immediately following contract award and delivered for FAA verification and acceptance during FAT. The first primary radar interface (accommodates the FPS, ARSR-1 and ARSR-2 radars) is also defined in the ATCBI-6 specification. This interface may also be tested as part of the FAT, but may be verified at a later date at the FAATC depending upon whether a BOS or a FPS site is selected for IOT&E during contract negotiations.

The ARSR-3 and ARSR-4 primary radar interfaces will be completed next. Development of these interfaces will begin with a Level of Effort Task Order initiating prime contractor support in the development of an IRD. The development will end with successful OT of these interfaces installed in an ATCBI-6 at the Mike Monroney Aeronautical Center in Oklahoma City where both an ARSR-3 and an ARSR-4 support system are located.

To the extent that funding permits the ATCBI-6 interface development for each developmental interface will be conducted in parallel such that all interface development is completed as soon as possible. Interface availability will provide flexibility in the ATCBI-6 site delivery schedule, which is highly desirable in the enroute environment.

8.a.3. Facility and Organizational Integration

The ATCBI-6 Product Team includes an Associate Program Manager for NAS Integration (APMNI). This team member plays a major role in and is responsible for coordinating the integration of the ATCBI-6 with NAS facilities and many other FAA organizations. The APMNI is responsible for establishing a Program Implementation Plan (PIP) which will be disseminated as necessary to facilitate the successful integration of the ATCBI-6 with NAS facilities and organizations. The drafting of the PIP will begin with site surveys of a sampling of each type of radar site to receive an ATCBI-6 and will end with the development of a Technical Officers Representative’s (TOR) handbook. The surveys will allow for the development of site specific requirements. The TOR handbook will provide TORs and regional engineers with information to prepare them for and guide them through the installation, acceptance testing and optimization activities associated with the ATCBI-6. The PIP will remain a “living document” to capture lessons learned and provide additional information as necessary during the system implementation process. This document will be available via cc:mail and/or the Internet to provide easy access to all interested parties.

Also, the ATCBI-6 Product Team is operating in the spirit of the Integrated Product Team (IPT) management concept. There are 7 “core” team members, all of which are assigned “extended” team members. It is the responsibility of the core team members to distribute information as necessary to extended team members in a manner commensurate with the accomplishment of team goals as established in the ATCBI-6 APB. Including all core and extended team members, all FAA organizations have representation on the ATCBI-6 Product Team. Through this communication networking philosophy, the ATCBI-6 Product Team has been actively involved with initiatives such as the Fuschia Book and Currant Book updates, STARS ASTERIX message format implementation planning and Regional Associate Program Managers (RAPM) Conferences and will continue to do so. Coordination with the regions will increase from bi-annual conferences to monthly or bi-weekly teleconferences as the program approaches the deployment phase of the implementation process.

8.b. Software Integration

The approach described in sections 8.a., 8.a.1 and 8.a.2 also applies to the area of software integration. Additionally, the ATCBI-6 Product Team includes a Software Engineering Lead. This individual will be responsible for managing software development necessary for both NAS adaptation and interfaces.

Prior to contract award the vendor’s software development process will be reviewed. After contract award, the contractor will be required to submit a software development plan (SDP) to include the activity of integrating the new software with the COTS/NDI software.

8.c. Human/Product Integration

A Human Factors representative joined the ATCBI-6 Product Team during the Investment Analysis Process as required by the AMS. In general, Air Traffic Controllers will not be impacted (except for improved performance) by the ATCBI-6 as it will be a direct replacement for the service currently provided by the ATCBI-4/5 systems. Airway Facilities (AF) personnel will receive appropriate training which will be coordinated via the Associate Program Manager for Logistics (APML) of the ATCBI-6 Product Team. Although the AF training will be based on COTS/NDI training materials, some adjustments may be necessary to adapt this training for use by the FAA. The APML will be responsible for ensuring all training courses and materials are acceptable for use by the FAA.

8.d Spectrum Management

As the ATCBI-6 is a direct replacement for existing NAS equipment, this product will not require additional RF spectrum. In fact, the ATCBI-6 will utilize the spectrum currently allocated to secondary surveillance more efficiently. The only coordination that must continue with the FAA’s spectrum managers is that which is necessary to assign Pulse Repetition Frequencies (PRF) to each ATCBI-6 site. This is necessary to minimize interference with adjacent sites. The ATCBI-6 Product Team’s System Engineer will be responsible for coordinating this effort in a similar manner to that already accomplished for the Mode S program.

**9. IN‑SERVICE SUPPORT**

**a. Maintenance Concept**

The ATCBI will employ a two level maintenance concept, site and depot, for life cycle support of the system. The two maintenance levels are described as follows.

Site level maintenance will consist of preventive and corrective maintenance tasks. Preventive maintenance tasks shall be scheduled and be required no more frequently than once within each 91 day period. Preventive maintenance shall require no more than four hours. Corrective maintenance, as required, shall be scheduled so that it does not interrupt normal system operation. The beacon software will provide fault isolation capabilities that will permit failures to be isolated to a single Line Replaceable Unit (LRU). The site level technician will be trained in fault isolation to the LRU level, removal and replacement of faulty LRUs, restoration of the system to operational capability, and the ability to certify the repaired system/subsystems as required.

Besides the BIT/FIT capabilities of the ATCBI‑6, technicians will also be provided with external monopulse test equipment. The ATCBI test sets in use today do not generate monopulse reply signals necessary to measure receiver performance, including overall system sensitivity, a certification requirement, nor can they be operated remotely. Thus, monopulse test equipment must be provided to allow FAA technicians the ability to certify and maintain the ATCBI‑6 monopulse system.

Depot level maintenance will consist of those maintenance activities which are beyond the capability of the site technician including complete rework of system LRUs and the beacon system, including chassis, if required. Depot level maintenance will also include the complete restoration of associated support and test equipment.

An organic depot will be established no earlier than five years after contract award. This will allow time to determine requirements for spare parts and Contractor LRU repair. It will also lessen the effects of parts obsolescence.Depot level hardware maintenance will be performed by the contractor from the time of first system acceptance through the year following successful installation and check out of the first ATCBI-6 system to be configured with final interface (approximately 5 years[[5]](#footnote-5)). Transition of second level software support, to include establishment of a PSF, will begin one year prior to the delivery of the final interface and will continue for one year following successful installation and checkout of the final interface.In the event that the Product Team wishes to extend contractor software second level support, the contract will be structured to allow for continued service beyond one year after the successful installation and checkout of this interface.

Engineering support for the life‑cycle of the ATCBI‑6 shall be the responsibility of AOS‑200. Engineering support will consist of technical engineering support and configuration management for the ATCBI‑6 software (including operational, diagnostic, and support ), hardware, and firmware. Technical guidance will be provided to field technicians and engineers for the optimization and long‑term support for the ATCBI‑6. Field support activities will include guidance to prepare the ATCBI‑6 for commissioning and guidance or assistance on‑site when field technicians and engineers require additional expert assistance to optimize or troubleshoot the system after commissioning. Software/hardware trouble reports generated by field technicians and engineers will be used as a basis to modify and upgrade the ATCBI‑6 in order to ensure it performs at optimum capability at all established facilities.

AOS‑200 will design, distribute and maintain configuration control of software/firmware code changes or electronic equipment modifications to correct defects or alter system performance to ensure that the ATCBI‑6 meets operational requirements. AOS‑200 will author and maintain the ATCBI‑6 equipment maintenance handbook which provides guidance and prescribes technical standards and tolerances, and procedures applicable to the maintenance and inspection of ATCBI‑6 facilities. This order will contain preventive maintenance task and schedules and will establish certification requirements used by field technicians to maintain the ATCBI‑6. AOS‑200 will also maintain, update and be the configuration focal point for the equipment technical instruction book provided by the vendor for the ATCBI‑6 system.

**b. Staffing**

Based on FAA Order 1380.40B, “Airway Facilities Sector Level Staffing Standard System,” the contractor will recommend to the FAA the total number of personnel, by skill level, required at each site to operate and to maintain the system.

**c. Supply Support**

Initial site and depot sparing, if required, will be funded and procured by AND‑450. The selection of site and depot sparing will be based on the contractor’s recommended listing based on the results of a tailored LSA program, incorporating any historical data currently available. AML‑600, along with other selected FAA organizations, will review the contractor’s sparing recommendations and chair a provisioning conference to determine the exact range and depth of repair parts required to support the system. Items to be provisioned that are not in the FAA inventory will be cataloged. The spares acquisition incorporated with production (SAIP) program will be employed to take full advantage of economies of scale, economic ordering quantities and the contractor’s active production.

Replenishment spares will be funded and procured by the Logistics Center.

**d. Support Equipment**

The Contractor will provide a justified listing of all common and special tools, support and test equipment, and interface devices and connectors required for the operation and maintenance of the beacon system, at both the site and depot levels. The FAALC will review the proposed listing and compare it against the FAA’s current equipment inventories to identify commonality. Any discrepancies will be forwarded to the Contractor for resolution. The contractor will make every effort to minimize the requirement for special tools and/or test equipment. The listing will be used by the PT to procure the required equipment for site and depot level support.

In addition, the Contractor will identify any additional hardware, software and documentation requirements to support the maintenance of the commercial and developed support and test equipment. The Acquisition of any additional hardware, software and documentation for this effort will be procured and funded by the program office.

**e. Technical Data**

The contractor will deliver the documentation required for full operation and support of the system. Technical documentation will be submitted in both hard copy and automated format to facilitate changes and revisions. Drawings are to be provided on electronic media as available and compatible with the FAA Computer Aided Engineering Graphics (CAEG) System. Technical data supplied to the FAA will be in both hard copy and electronic media compatible with the Interleaf documentation management system. Items to be provided include equipment instruction books, provisioning technical documentation (i.e., spare parts‑peculiar list, numerical parts list, engineering drawings, tools lists, etc.), training course materials, support equipment listing and data and associated program plans required by the contract.

The cognizant AOS branch will develop, distribute, and maintain the system handbook.

**f. Training and Training Support**

Airways Facilities and Air Traffic initial training will be funded and procured by AND‑450. Hardware maintenance training will be COTS unless the available materials/courses are not approved by AFZ‑100. Developed site level hardware maintenance training will be IAW FAA Order 028B. If required, additional depot level training will be developed using best commercial practices.

Attrition training will be under the purview of the FAA.

**g. Packaging, Handling, Storage, and Transportation**

All equipment and components shipped to the sites will be packaged and marked in accordance with ASTM‑D‑3951, “Standard Practice for Commercial Packaging.” All equipment and components shipped to the Logistics Center shall be shipped in accordance with MIL-STD 2073-1, packaged Level A and packed Level C. Exchange and Repair items will be packaged in a reusable type container to facilitate round trip shipments between facilities and the repair source. All spares shipped to the sites will be packaged and marked in accordance with ASTM‑D‑3951. Common hardware items will be packaged in multiple unit pack quantities as normally supplied through retail channels or in standard commercial unit packed quantities compatible with unit of issue. All common hardware items will be packaged and marked in accordance with ASTM‑D‑3951.

The contractor will identify any unique storage requirements, site and/or depot, for the system or related spares and equipment. The contractor will attempt to design the system to be compatible with current FAA storage facilities.

**10. TEST AND EVALUATION STRATEGY**

The ATCBI-6 Program’s System test and evaluation activities will seek to minimize technical and cost risk to the government while limiting the scope of the test activities to that which may be accommodated within the allocated schedule. The key to this strategy is pre-contract-award technical testing of COTS equipment and the application of existing certified test data. The major element of the procurement is expected to be a NDI. This will be a fully functional monopulse secondary surveillance radar system which will include monopulse receiver, transmitter and data processing subsystems. Since these COTS/NDI systems are expected to be mature and stable designs, the critical functional elements of the prime mission equipment should be available at contract award. Interfaces to existing FAA primary radars and ATC automation equipment are expected to be developed under the contract, but these activities are anticipated to be minimal with respect to engineering and test activities.

The ATCBI-6 Program has been designated for IOT&E by ATS-1. IOT&E is a full system level evaluation conducted in an actual operational environment at the key site. IOT&E will occur after system testing is completed and the assessment will be reported and utilized in support of the In-Service Decision (ISD).

**A. Test Strategy Overview.** The System test program will begin during the pre-contract award period as part of the screening effort. Each vendor will be requested to provide to the Government a system which will be evaluated during OCT. All systems will be subjected to identical operational environments by co-locating them at a single site with a shared antenna. Assessments will be made in the areas of surveillance performance, capacities, NDI interfaces, system control and maintenance. In addition to live world operations, the Aircraft Reply and Interference Environment Simulator (ARIES) test tool will be used to evaluate system operations under high target loads (700 aircraft) and high stress surveillance situations. OCT will be performed at the William T. Hughes FAA Technical Center; the duration of the formal test will be approximately three weeks. A common test plan will dictate the test activities, types of input/output data to be used and analysis methods utilized. Specialized test procedures will be allowed to accommodate differences in the COTS/NDI systems under test. The OCTs will focus on the key requirements of the system functional specification, but specific detailed, derived requirements may be evaluated for each offeror. The conduct of the OCTs prior to contract award will contribute significantly to risk reduction in the technical and schedule areas because the Government will be performing a technical evaluation of the system in addition to the typical paper evaluation used in the selection process.

The overall test program after contract award will be comprised of three phases;

1) First Article Test

2) FAA Operational Test (FAA Technical Center and Key Site)

3) FAA IOT&E (key site)

The FAA Verification Requirements Traceability Matrix (VRTM) will be used as the central tool used to assure the ATCBI-6 system compliance to operational and performance requirements of the FAA. This composite list of all NAS-SS-1000, Requirements Document (RD) and ATCBI-6 System Specification requirements imposed on the ATCBI-6 system, will provide the test traceability for all FAA and contractor conducted tests. The matrix will show allocation of each requirement to a specific test activity and identify the responsible organization obligated to conduct that test along with the measure needed for verification. The test allocations of the VRTM along with the test schedule and test resource allocations contained in the Integrated Program Plan (IPP) will encompass the core elements of the ATCBI-6 test program. As the program matures through the acquisition and field deployment process, the VRTM and IPP will be updated to reflect the changes.

**B. Developmental Test[[6]](#footnote-6) Strategy.** The test activities from contract award through Government acceptance of the first system will be the responsibility of the selected contractor. The System Functional Specification, along with the Contractor Verification Requirements Traceability Matrix (CVRTM) derived from that specification, will be the focal point of these tests. The CVRTM will be extracted directly from the VRTM by selecting those requirements allocated to the contractor for verification. This contractor testing will be segregated into three functional areas:

1) First Article Test : In-factory verification of performance, system control, interfaces, maintenance, mechanical and quality requirements.

2) Production Test: In-factory re-verification of key requirements and quality assurance checks; performed on every system.

3) Site Acceptance Test: Verification at each field site that the installed system is fully functional and ready for FAA commissioning activities.

Before FAA acceptance of the first system, the test program will be similar to conventional Developmental Test (DT) activities, but with key aspects revised to take full advantage of the COTS/NDI equipment. Test data which was acquired during formal test activities with other government or commercial buyers of the test article will be considered for verification of requirements during the ATCBI-6 formal tests. Application of this previously certified test data will significantly shorten the test program schedules and reduce cost to both the contractor and the Government. All requirements of the CVRTM will be verified by the contractor during formal tests approved and witnessed by the Government either through actual test conduct or application of previously certified data. Each prospective contractor will be asked during the evaluation period to provide estimates of the impact previously certified test data will have on its test program and to make that data available for government review.

The MSSR system will be baselined within three months after contract award, prior to any conduct of formal DT activities. The intent, in order to keep first key site delivery schedule to a minimum, is to baseline a configuration as close to the COTS/NDI configuration used during the OCT activities. Only essential developmental activities needed for initial deployment will be allowed. The most probable configuration will be that of a Beacon only site or an ARSR-1/2/2 radar interface to the MSSR. CD-2 format will be the output surveillance data stream sent to the ATC automation system and if collocated with a primary radar system, the MSSR will accept CD-2 format digitized primary target and weather data. Additional radar and automation interfaces will be added to the system baseline and incrementally tested as they become available. A majority of these interfaces are expected to be developmental activities performed under Level of Effort Task Orders..

**C. Operational Test Strategy.** The OT will begin after FAA acceptance of the first system. The majority of the DT effort is expected to be completed by this point, but due to the numerous primary radar and ATC automation systems which need to be supported, some of the system configurations which are scheduled for outyear deployment will not be available. The OT effort will, however, only be conducted on system configurations which have successfully completed DT. As the later configurations become available, delta OT will be conducted to ensure that all fielded configurations receive appropriate tests. The William J. Hughes FAA Technical Center will be the prime location used in the conduct of the OT activities since most of the NAS radar and automation systems expected to be used with the ATCBI-6 are or will be available there.

During OT the ATCBI-6 Critical Operational Issues (COIs), as defined in the RD, will be resolved. These COIs include:

1. The SSR’s ability to achieve the thresholds established for the following critical system characteristics:

a. Detection Volume (3.1.2).

b. Detection Probability (3.1.3).

c. Surveillance Data Processing (3.1.7).

d. Surveillance Target Capacity (3.1.8).

e. Aircraft Resolution (3.1.10).

f. Reliability, Maintainability, and Availability (3.2.1).

2. The SSR’s compatibility with the existing NAS.

3. The SSR’s operational safety and maintenance.

4. The SSR’s ability to provide user friendly interfaces that support operations and maintenance while minimizing personnel skill requirements and training time.

5. SSR optimization, adaptation to site conditions, and certification by available maintenance personnel in a timely manner.

The first phase of OT will be the integration testing of the secondary surveillance system with the associated NAS systems. Any integration testing which was successfully conducted as part of the DT phase will not be repeated during OT. Each NAS configuration will be fully integrated and checked for operational compatibility, functional performance, control and degraded operations. The next OT phase will evaluate operational performance, suitability and effectiveness. The focus of this phase will be to relate operational characteristics of the system to needs and activities anticipated in an operational environment. Data collected will be quantitative in nature and will attempt to assess the quality of the provided service along with the maintainability and reliability aspects. The final phase of the OT will be an operational evaluation. This activity will be more subjective in nature and will call upon the expertise of field technicians, engineers and air traffic controllers. Testing at the William J. Hughes FAA Technical Center will be preferred for a majority of the initial Operational Evaluations in order to both minimize risk and shorten schedules. However, due to the influence environment has on the surveillance performance of the system, it is essential that the final evaluations be conducted at a test key site where controllers can more accurately relate performance to a known airspace. ATCBI-6 has been identified as an IOT&E program. The OT Quick Look Report provided to ATS by the PT will identify all major issues for the OT phase and will provide a recommendation to IOT&E as to the readiness for field deployment. Concluding the OT at a key field site also allows for a smooth transition into the IOT&E activities.

**D. Site Acceptance Testing (SAT):** As part of the ATCBI-6 program, the contractor will be required to prepare and deliver a SAT Plan and SAT Procedures. The government will review and approve these documents prior to delivery of the ATCBI-6 to the key site. The site acceptance activities at the key site will be used to verify the SAT Plan/Procedures. These documents will then finalized and will be used during the site acceptance of each production system.

**E. IOT&E** The Associate Administrator for Air Traffic Services (ATS-1) has designated the ATCBI-6 program for IOT&E. IOT&E on the ATCBI-6 will be a full system-level evaluation conducted in an actual operational environment to confirm its operational readiness to be a part of the NAS. The ATCBI-6 IOT&E will address both the initial system configuration(s) and the sequential interface developments. IOT&E will be conducted following the Associate Administrator for Research and Acquisition’s

(ARA-1’s) IOT&E Readiness Declarations (IOTRD). The IOTRDs will declare the system’s readiness for IOT&E and address the availability of resources required to conduct IOT&E. IOT&E will be conducted by an ATCBI-6 ATS Test Team, with members from Air Traffic (AT) and Airways Facilities (AF) and will be led by the designated IOT&E Program Manager from the Office of IOT&E (ATQ). The team will assess and report on the operational effectiveness and operational suitability of the ATCBI-6 system in support of the In-Service Decisions (ISD) for the both the initial system configuration(s) and the sequential interface developments.

**E.1 IOT&E Strategy.** Prior to the conduct of IOT&E, ATQ and the ATS Test Team will monitor PT System Test activities (including OCT) to gain information on the readiness of the system and to obtain data to supplement the data collected during the IOT&E conduct. The ATS Test Team will notify the PT of any operational risk areas identified as a result of this early involvement. Following acceptance of the IOTRD by ATS-1, IOT&E will commence. IOT&E will be conducted at the key site(s) that are selected by the Product Team. IOT&E requires an operationally realistic environment representative of the environments to which deployed systems will be subjected.

During IOT&E, AT and AF personnel will operate, maintain, and use the system to control live air traffic as the ATCBI-6 is designed to work in the NAS. The ATS Test Team will observe and collect quantitative and qualitative data. Data will be in the form of test results regarding system physical and operational performance (e.g. Host Radar Analysis Tools, RBAT, etc.), AT and AF questionnaires, and judgment based upon the ATS Test Team’s operational experience. Data collection will be focused on resolving the Critical Operational Issues (COIs) defined in the ATCBI-6 Operational Requirements Document. To ensure the traceabilty of data to each COI and to assist in test planning, the COIs will be decomposed into appropriate Measures of Effectiveness (MOEs) and Measures of Suitability (MOSs). The ATS Test Team will meet to assess the operational readiness of the ATCBI-6 as measured by the resolution of the COIs. The assessment will be delivered within ten days of the conclusion of IOT&E to both ATS-1 and to the Director of the Airways Facilities Service, AAF-1, who is the ISD decision maker for ATCBI-6.

Following the initial system configuration(s), the PT will perform System Testing on each of the sequentially developed interfaces at a key site(s). Prior to full deployment of each interface configuration, the PT will request an ISD. For the ARSR-3 and ARSR-4 configurations, the ATS Test Team will monitor System Testing and carry out follow-up IOT&E to support the associated ISDs. Follow-up IOT&E will use the same COIs as those used in the initial effort; however, the MOE and MOS decomposition may differ. The team assessment and reporting process will be similar to that used for the initial effort.

**E.2 Limitations to Scope of IOT&E on the Initial Configuration(s).** Two possible limitations to the scope of initial IOT&E have been identified:

***a) The initial ATCBI-6 IOT&E will be limited to the existing radar configuration at the key site.*** The acquisition strategy for the ATCBI-6 calls for the interfaces to all existing enroute radars (military FPS, ARSR-1/2, ARSR-3 and ARSR-4) to be developed sequentially. Depending on the vendor selected, the key site may be a Beacon Only Site (BOS), an FPS site, or an ARSR-1/2 site.

1. ***If the Key Site is a Beacon Only Site, ATCBI-6 susceptibility to Electromagnetic Interference (EMI) cannot be fully assessed.***  Experience with Mode S indicates that EMI can be severe at older NAS enroute radar sites. This severe EMI environment can have major impacts on monopulse beacon surveillance systems.

Follow-on IOT&E on the sequentially developed interfaces is planned to address these limitations.

**E3. Pre-requisites for IOT&E Commencement.** The conduct of IOT&E is dependent upon ATS-1 accepting ARA-1’s IOTRD. The IOTRD should address the following pre-requisites:

1. Release and installation of the hardware/software baseline which is intended for operational use and has been configuration controlled;
2. Site acceptance by the FAA at the key site;
3. IOT&E Test Team members and participants’ training is complete (must be representative of national training)
4. Draft user and maintenance manuals are complete and authorized for use at Key Site;
5. The Y2K Certification Compliance for the system has been completed and will be delivered to the ATS Y2K Program Office, AAF-6, at least two weeks prior to the ISD; and
6. All outstanding issues for entry into IOT&E have been fully described and resolved.

**E.4 IOT&E Plan, Procedures, and Reports.** The ATS Test Team will generate an IOT&E Plan and IOT&E Procedures prior to conducting IOT&E at the key site(s). A Quick Look IOT&E Report will be generated for each IOTE Evaluation (initial & follow-on) within 10 days of completing IOT&E, and a Final IOT&E Report that will cover all of the IOT&E evaluations will be completed within 60 days of the final ATCBI-6 IOT&E.

**E.5 IOT&E Assessment** The operational evaluation for the ATCBI-6 will result in one of three possible assessments:

*Fully Operationally Effective/Suitable:* The COIs were satisfactorily resolved, and the system meets or exceeds the operational requirements defined by the COIs.

*Partially Operationally Effective/Suitable:* Most of the COIs were satisfactorily resolved, and those COIs that are unsatisfactorily resolved are assessed as not critical enough to rate the system as Not Operationally Effective/Suitable.

*Not Operationally Effective/Suitable:* A majority of the COIs were not satisfactorily resolved, and the system meets none or very few of the operational requirement expressed in the COIs, or at least one of the COIs has operational shortcomings that are considered critical enough to rate the system as Not Operationally Effective/Suitable.

If, as a result of IOT&E, the ATS Test Team determines that the system is not operationally ready, the team will recommend to ATS-1 that the system be returned to the IPT for further development and/or corrective action. During the conduct of IOT&E, the IPT may withdraw the system if they determine that further development and/or corrective action is required before IOT&E proceeds.

**11. IMPLEMENTATION**

Prior to deployment of ATCBI-6 systems, the PT will follow the In-Service Review (ISR) process as described in the Deployment Planning section of the AMS (Section 2.9.3). This process ensures the operational readiness of the acquired ATCBI-6 systems and the readiness of the NAS infrastructure to accept, operate, and maintain the system. The PT will tailor the generic ISR checklist to suit the ATCBI-R program. When all items on the checklist have been adequately resolved, the PT will provide the required briefing to the designated In-Service Decision Authority, AAF-1, to obtain approval to begin ATCBI-6 deployment.

**a. Concept.**  The Contractor will provide all personnel, facilities, equipment, licenses, permits, and other materials and services necessary to meet the requirements specified in the FAA contract. The Contractor shall maintain comprehensive installation and test activity logbooks throughout the installation and testing phases at each site. Contractor furnished equipment and material will consist of two types: 1) those items whose ownership remains with the Contractor and are removed from the site after acceptance of the radar system by the FAA, such as the Site Test Transfer Switch (STTS), and 2) those items which remain on‑site and become Government property upon acceptance of the Contractor’s on‑site effort. A Deployment Readiness Checklist, or variant thereof, will be used to guide the FAA and the Contractor throughout the implementation phase of the ATCBI‑R procurement. The FAA shall assign a Technical On‑Site Representative (TOR) to monitor and assist Contractor personnel, as appropriate, during the installation and checkout period.

**b. Resource Planning**. The Contractor will conduct on‑site pre‑installation coordination meetings and facility visits with local FAA officials to assess the existing conditions and identify/resolve issues related to schedule, security, safety, equipment delivery and installation, cutovers, shutdowns, receipt and storage of government equipment, and other materials and equipment needed to ensure proper installation and checkout of the ATCBI.

(1) The Contractor will prepare a list of personnel, by labor category and an estimate of staff‑hours for each labor category, deemed necessary to perform all tasks associated with the production, testing, quality control shipment, delivery, installation and checkout of each beacon interrogator produced under this contract. Additionally, contractor installation teams consisting of the minimum number of fully qualified key personnel will be designated. The actual number of installation teams will be at the discretion of the Contractor with the understanding that the installation rate established in the contract will be achieved.

(2) The Contractor will provide an installation plan which demonstrates effective staging, shipping, delivery, installation and integration of each ATCBI‑6 procured by the FAA. The actual equipment installation for each site may vary. Therefore, the plan will include provisions for site unique considerations and ancillary equipment for various configurations and subsystem interfaces. Other provisions of the installation plan will include, but not be limited to, the following:

a. Site preparation.

b. FAA interface and coordination of access to individual sites.

c. Detailed installation schedule which includes activities such as anticipated outages and acceptance testing periods.

d. Detailed site acceptance test plan which provides for complete testing of the operational capability of the ATCBI‑6

**c. Acceptance Criteria**. The Government shall ensure that the systems being provided under this contract are in full compliance with the specified performance requirements. Acceptance of each ATCBI‑6 system will be determined by satisfactory achievement of site acceptance test criteria specified in an FAA approved site acceptance test procedure and as a result of formal on‑site testing.

**d. Radar Coverage During Transition**. Radar coverage during the period of installation and checkout of the replacement beacon interrogator will be provided by the existing radar systems. The Contractor will provide a means to switch between the operational radar systems and the replacement beacon interrogator whenever it becomes necessary to operate or test the replacement beacon interrogator. The Contractor will make the appropriate advanced arrangements with the FAA Sector Management Office (SMO), airport authorities and TOR prior to requesting an outage or requesting other considerations which could or would impact normal air traffic operations.

**12. QUALITY ASSURANCE STRATEGY**

Quality Assurance (Q.A.) Controls:

The contractor will establish and maintain a Quality Assurance (Q.A.) Program in accordance with the contract (ISO‑9001‑1994 and ISO‑9000‑3).

A proposed Quality System Plan will be provided by the contractor (along with the rest of the proposal.) The Plan will document how the contractor’s procedures and controls meet the requirements of the Q.A. Standards. An acceptable Quality System Plan will be incorporated into the contract.

A FAA Quality Reliability Officer (QRO) will be assigned to the contractor to provide oversight (by audit) of the contractor’s Q.A. program, to witness tests, and to be the Government representative for acceptance of the contractor’s equipment and services, and to sign the FAA Form 256.

Q.A. Standards:

The following two international industry Quality Assurance Standards are to be applied to this contract:

ISO‑9001‑1994 and ISO‑9000‑3

Actual titles:

ANSI/ASQC Q9001‑1994 AMERICAN NATIONAL STANDARD

Quality Systems ‑‑ Model for Quality Assurance in Design, Development, Production, Installation, and Servicing.

ISO 9000‑3 INTERNATIONAL STANDARD

Quality management and quality assurance standards ‑‑ Part 3:

Guidelines for the application of ISO 9001 to the development, supply and maintenance of software. (First edition 1991)

**13. CONFIGURATION MANAGEMENT STRATEGY**

Configuration management (CM) is the systems engineering management process that identifies the functional and physical characteristics of an item during its life cycle, controls changes to those characteristics, and records and reports change processing and implementation status. The degree of CM change control for a non-developmental item (NDI) begins with the recognition and documentation of a known hardware and software baseline. The level of CM documentation required to define the NDI product baseline is influenced by the planned maintenance concept for the equipment. For example, the requirement for FAA organic repair of equipment necessitates the procurement of piece-parts. Also, FAA organic operational support for software maintenance requires a documented software baseline from which changes resulting from software maintenance and/or enhancements can be accomplished. In both of these examples, a known hardware and software baseline are required to achieve a successful transition from contractor- to FAA-maintained system baseline.

The ATCBI-6 Contractor will be responsible for developing and implementing a CM plan which details the requirements for identifying, controlling, and maintaining CM for hardware, software, firmware, and engineering /commercial documentation throughout all contract identified baselines. In addition, the Contractor will establish a Configuration Control Board (CCB) and develop CCB procedures to establish baselines and support baseline management. Besides the Contractor and at least two PT core members, Operational Support (AOS) and IOT&E (ATQ) will be represented on the CCB. The Contractor will maintain traceability of component and configuration changes to each baseline; a record of the sequence of baselines; currency of the Contractor’s baselines; and consistency among program documentation, including versions for hardware, software, firmware, and data bases.

The Contractor will host and participate in joint Contractor/FAA System Baseline Reviews (SBRs) for the ATCBI-6 Beacon System. SBR I for the ATCBI-6 Prime Mission Equipment (PME) first article configurations shall be conducted forty-five (45) days after contract award. The Contractor will utilize the requirements specified in MIL-STD-1521B for conducting a Critical Design Review (CDR), as applicable to the ATCBI-6 PME, as guidance in preparing for and participating in this review. During this review, the Contractor and FAA will jointly review the Contract Award Configuration (CAC) hardware and software plus the results of any development effort necessary to satisfy the FAA-E-2923 specification functional and performance requirements for the first article configuration PME. A SBR I for the Program Support Facility (PSF) will be conducted as a joint Contractor/FAA review of this end item once the development effort for this end item has been completed. Depending upon the completion of the development effort required for the PSF, the PSF SBR I may be combined with the ATCBI-6 PME SBR I, or may be conducted as a separate review.

The Contractor will utilize the hardware and software configuration baseline established at the respective SBR I to serve as the hardware and software configuration baseline for conducting the DT effort as specified in the ATCBI-6 Beacon System Statement of Work (SOW). Therefore, completion of SBR I and joint Contractor/FAA agreement on the resolution of all outstanding issues will be required prior to the Contractor initiating DT effort. The Contractor will manage hardware and software engineering changes to the SBR I configuration baseline in accordance with the Contractor’s CM Plan, as approved by the FAA.

The ATCBI-6 PME and PSF SBR II’s will be conducted at the conclusion of the Contractor’s DT program and the Physical and Functional Configuration Audits (P/FCA’s) for the respective end item configuration. The Contractor will utilize the requirements specified in AFSCR 84-2, Production Readiness Review, as applicable to the ATCBI-6 end item procurement, as guidance in preparing for and participating in these reviews. During the SBR II reviews, the Contractor and FAA will jointly review the results of the Contractor’s DT program, and the results of the P/FCA’s to identify and resolve outstanding issues which impact the delivery of the end item and/or the establishment of a product baseline configuration for each end item. The hardware and software product baseline will be established at SBR II for each end item. The Contractor will reflect this SBR II product baseline in the subsequent delivery of all technical data deliveries, as specified in the ATCBI-6 Beacon System SOW. The Contractor will manage hardware and software engineering changes to the SBR II configuration baseline in accordance with FAA-STD-021.

Once the ATCBI-6 product baseline is established, the Contractor will be responsible for preparing and delivering to the Government Class I and Class II engineering change proposals (ECPs) following the guidelines and/or requirements specified in FAA-STD- 021, Configuration Management (Contractor Requirements). The ATCBI-6 Contractor will be responsible for implementing the Government approved ECPs, deviations, and waivers throughout the term of the contract.

**14. HUMAN FACTORS STRATEGY**

Since the ATCBI‑6 will be a direct replacement for the ATCBI‑4s/‑5s, it does not appear that the human performance requirements for the operators, maintainers, and support personnel will change from current levels. As the ATCBI‑6 will be a COTS/NDI procurement, human factors efforts will focus on new training requirements, development of new operational and maintenance procedures, and the computer‑human interface. Human factors specialists will participate in the Operational Capability Test and their assessment will be considered in the selection of the final vendor.

**15. IN‑SERVICE MANAGEMENT**

During the in‑service phase of the ATCBI‑R program, the PT will monitor and evaluate the need for mid‑life sustainment measures and/or upgrades. The team’s operational support representative will be the person responsible for surfacing enhancements needed in the field. The systems engineering function within the team will work with other product teams and ASD‑100 (NAS Architecture) to assess the need for changes to satisfy future demand for services within the NAS, e.g. implementation of an ASTERIX interface.

Once a sustainment measure or performance upgrade has been validated as a need, the PT will use the program control methods tools described above to monitor the sustainment/ upgrade project (see section 5. above: b.2. “Program Control”, b.3.. “Contract Management”, b.5.. “Risk Management”).

**Glossary of Acronyms**

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| ARIES | Aircraft Reply and Interference Environmental Simulator |
| ARSR | Air Route Surveillance Radar |
| ARTS | Automated Radar Terminal System |
| ASP | Acquisition Strategy Paper |
| ASR | Airport Surveillance Radar |
| ASTERIX | All Purpose Structured EUROCONTROL Radar Information Exchange |
| ATC | Air Traffic Control |
| ATCBI | ATC Beacon Interrogator |
| ATCBI‑4 | ATCBI, Model 4 |
| ATCBI‑5 | ATCBI, Model 5 |
| ATCBI‑6 | ATCBI, Model 6 |
| ATCBI‑R | ATCBI Replacement Program |
| ATE | Automated Test Equipment |
|  |  |
| BIT | Built‑In Test |
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| CAEG | Computer—Aided Engineering Graphics |
| CBA | Cost Benefit Analysis |
| CCB | Configuration Control Board |
| CD—2 | Common Digitizer, Model 2 |
| CDRL | Contract Data Requirements List |
| CMM | Capability Maturity Model |
| CM | Configuration Management |
| CPAF | Cost Plus, Award Fee |
| COTS | Commercial Off—the—Shelf |
| CSER | Contractor Site Engineering Report |
| CWBS | Contractor Work Breakdown Structure |
|  |  |
| DARC | Direct Access Radar Channel |
| DM | Data Management |
| DOP | Detailed Obligation Plan |
| DT&E | Developmental Test & Evaluation |
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| EARTS | Enhanced Automated Radar Terminal System |
| ECP | Engineering Change Proposal |
| EPA | Environmental Protection Agency |
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| FFP | Firm Fixed Price |
| FIT | Fault Isolation Test |
| FPS | military Fixed Radar Surveillance |
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| GPN | military Ground Radar Navigation |
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| IOT&E | Independent Operational Test & Evaluation |
| IPP | Integrated Program Plan |
| IPT | Integrated Product Team |
| IRD | Interface Requirements Document |
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| HCS | Host Computer System |
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| JRC | FAA’s Joint Resources Council |
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| LRU | Line Replaceable Unit |
| LSA | Logistics Support Analysis |
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| MBTS | Monopulse Beacon Test Set |
| MSSR | Monopulse Secondary Surveillance Radar |
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| NAS | National Airspace System |
| NDI | Non—Developmental Item |
| NIMS | NAS Infrastructure Management System |
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| OCT | Operational Capability Test |
| OSHA | Occupational Safety and Health Administration |
| OT&E | Operational Test & Evaluation |
|  |  |
| PAT | Performance Acceptance Test |
| PMR | Program Management Review |
| PT | ATCBI‑R Product Team |
| PWBS | Program Work Breakdown Structure |
|  |  |
| QA | Quality Assurance |
| QRO | Quality Reliability Officer |
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| RF | Radio Frequency |
| RFO | Request for Offer |
| RMP | Risk Management Plan |
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| SAIP | Spares Acquisition Incorporated with Production |
| SEB | Source Evaluation Board |
| SEI | Software Engineering Institute |
| SI | Selective Interrogation |
| SIR | Screening Information Request |
| SMO | Sector Management Office |
| SSR | Secondary Surveillance Radar |
| STARS | Standard Terminal Automation Replacement System |
| STTS | Site Test Transfer Switch |
|  |  |
| TAC | AND‑400 Technical Assistance Contract |
| TCR | Test Configuration Review |
| TOR | Technical Officer’s Representative |
| TVRTM | Test Verification Requirements Traceability Matrix |

1. The ATCBI‑R Investment Analysis Team consists of members from investment analysis, systems engineering, air traffic and airway facilities requirements organizations and from the ATCBI‑R PT. [↑](#footnote-ref-1)
2. “These systems [ATCBI‑4s/5s] will cease to be economically supportable around the year 2000 due to parts obsolescence.” ATCBI‑4/5 Supportability Study, FAA Logistics Center [↑](#footnote-ref-2)
3. Assumes delivery rate of 4 systems/month. [↑](#footnote-ref-3)
4. Specifically covers that development necessary for interfaces to be defined after contract award. The first interface developed will fall under the FFP portion of the contract since it has already been defined. [↑](#footnote-ref-4)
5. There will be a 5-year provision in the contract for contractor maintenance and three 1-year options. See Section 5.c. [↑](#footnote-ref-5)
6. Although the PT expects to acquire a NDI system that requires little in the way of actual development, the term Developmental Test is used to be consistent with terminology in the FAA’s Acquisition Management System, wherein “Developmental Test” is used for testing the contractor performs (as opposed to testing the Government performs). [↑](#footnote-ref-6)