Eight-Pack Project Systems Review
February 22, 2002

X-Band TWTA
TWTA Block Diagram

Control System

Vacuum System

Lead Shielding

ES&H X-Rays

11424 MHz 75 MW/3.2 µs

Conventional Facilities LCW

RF Distribution System

11424 MHz 600 MW/4 µs

Temperature Monitoring

X-Ray Shielding

Modulator

Klystron

WR90

LLRF Input Drive

TWTA

11424 MHz 1 kW

X-Band TWTA Systems Review
TWTA Requirements and Specs

• **Major Requirements:**
  – Produce One kW of 11424 MHz RF for 3.2 Microseconds
  – Utilize No More Than 5 dBm of Drive from the LLRF System
  – Be Free of Glitches, Oscillations, Instabilities, Jitter

• **Other Requirements**
  – Minimum of 100 MHz of Instantaneous Bandwidth
  – No Water Cooling Required
  – Fit in Standard 19” Rack
  – Type N Input; WR90 Output

• **Open Items:**
  – Specification Published but No Feedback
TWTA Development Status

- TWTA is Outgrowth of SBIR Program
- More Than Ten TWT’s and Several Power Supplies Tested
- TWT Development Focus is on Lifetime and Cost Since Average Power is Insignificant
- Power Supply Development Focus is on Cost Since Sophistication is Low
- Basic Development of TWTA is Complete
- Awaiting Price and Delivery Quote from Prime (Tube Supplier)
  - Power Supply Manufacturer is Subcontractor
TWTA Schedule/Manpower Status

• **Schedule**
  – Awaiting Delivery Schedule from Manufacturer
    • Expect in Mid-March Following Prototype Demonstration
  – Expect Delivery in May

• **Manpower Status**
  – Minor Amount of Klystron Test Lab Technician and Engineering Assistance Required
  – Resources are Available Short of a Major Problem
TWTA Interfaces

- Control System
- Vacuum System
- LLRF Input Drive
- ES&H X-Rays
- Lead Shielding
- RF Distribution System
- Conventional Facilities LCW
- Temperature Monitoring
- WR90
- Modulator
- Klystron
- X-Ray Shielding
- TWTA

Specifications:
- 11424 MHz
  - 1 mW
  - 1 kW
  - 75 MW/3.2 µs
  - 600 MW/4 µs

John Cornuelle
2/22/02
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### TWTA Interfaces/Treaty Points

<table>
<thead>
<tr>
<th>Interfacing System</th>
<th>Treaty Point</th>
<th>Applicable Signals</th>
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<tbody>
<tr>
<td>LLRF</td>
<td>Type N Connector</td>
<td>5 dBm kW of RF at 11424 MHz</td>
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<tr>
<td>Klystron</td>
<td>WR90 Flange</td>
<td>One kW of RF at 11424 MHz</td>
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<tr>
<td>Control System</td>
<td>Front/Back Panel of TWTA</td>
<td>TBD</td>
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# TWTA Document Status

<table>
<thead>
<tr>
<th>ICD’s</th>
<th>Status</th>
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<tbody>
<tr>
<td>Klystron-TWTA</td>
<td>Not Planned</td>
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<tr>
<td>LLRF-TWTA</td>
<td>Not Planned</td>
</tr>
<tr>
<td>TWTA-Conventional Facilities</td>
<td>Not Planned</td>
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<tr>
<td>TWTA-Controls</td>
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**Specifications**

| X-Band TWTA                   | Complete      |
### TWTA Remaining Issues and Action Plans

<table>
<thead>
<tr>
<th>Principal Remaining Issues/Risks</th>
<th>Action Plans</th>
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<tbody>
<tr>
<td>Supplier May be Unreliable</td>
<td>Utilize Existing On-Hand TWTA’s</td>
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<tr>
<td>Tubes May Not Produce One kW</td>
<td>Utilize Existing On-Hand TWTA’s Klystron Gain May Suffice</td>
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<tr>
<td>Cost May Exceed Budget</td>
<td>Purchase Only Two TWTA’s</td>
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<tr>
<td></td>
<td>Utilize Existing On-Hand TWTA’s</td>
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