

# Straightforward modifications to upgrade C-5 maintenance training devices

## The Customer

United States Air Force  
C-5 MATS Program Office

## The Situation

### Trainers lack concurrency with aircraft.

The C-5 Maintenance Training Devices at Travis and Dover Air Force Bases featured cumbersome and outdated training tools that limited their effectiveness. The trainers no longer reflected the current aircraft's systems; bringing these trainers up-to-date provides the Air Force with concurrent training solutions and allows more convenient uploading of necessary operational data.

## The Challenge

At Travis Air Force Base, there was no capability to locally update operational data into the Combined Avionics Systems Trainer (CAST) Multifunction Display Units (MFDU); the MFDUs had to be removed to have operational data loaded off-site. Updates to the Versatile Integrated Avionics (VIA), Auxiliary Interface Unit (AIU), and Backup Integrated Processor (BIP) had to be done using an older data loader panel located in the Avionics Bay. Additionally, training devices at both Travis AFB and Dover AFB featured outdated graphics that differed from the actual aircraft components.

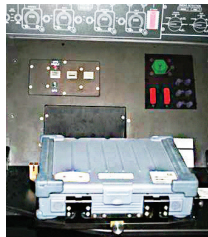
## The Solution

Nakuuruq and its subcontractor developed cost-effective solutions to deliver concurrency on C-5 Maintenance Training Devices, and developed technical documentation, training programs, and testing parameters as necessary to achieve the concurrency goal.



**Combined Avionics Systems Trainer (CAST)**—Installed partial Flight Engineers Station on the Avionics Bay. The Station includes an integrated Consolidated Loan

Panel (CLP) and a Malfunction Detection, Analysis, and Recording System (MADARS) laptop to provide a centralized location for software updates to the VIA, AIU, BIP, and MFDU at Travis AFB. The load enable switches were wired on the station between an existing 28 VDC power circuit and the load enable pins on each of the MFDUs. The CLP allows loading through three different sets of 1553 buses connecting specific Line Replaceable Units (LRU) on the trainer.



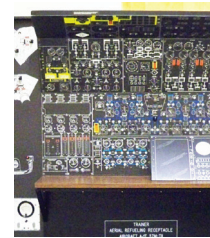
**Malfunction Detection, Analysis, and Recording Training System (MADARS III)**—Manufactured and installed a new front panel assembly with a cutout for the CLP and

the existing MADARS switch panel; installed the non-functional CLP onto the trainer and updated the DC, Engine Pylon Optical, and Smoke Detector Panels silhouettes at Travis AFB.



**Integrated Systems Trainer (IST)**—Replaced separate legacy display unit and controller panels with a single panel and installed the CLP and MADARS III laptop

silhouettes to correct the outdated depiction of aircraft systems on the Flight Engineers Station at Travis AFB.



**Aircraft Aerial Refueling Receptacle Trainer (AARRT)**—Installed CLP, MADARS III laptop, Multifunction Display Unit, Intercom, DC panel, and Engine Pylon Optical Panel

silhouettes to make the trainer concurrent with the aircraft system components represented at Travis AFB and Dover AFB.

Nakuuruq Solutions also provided updated technical documentation, including manuals, Illustrated Parts Breakdowns, wiring diagrams, mechanical and electrical drawings, operations and maintenance instructions and other technical data as necessary. Nakuuruq performed baseline testing to verify components worked as required, and all systems passed Formal Qualification Tests. Additionally, Nakuuruq provided a training course for Air Force instructors on the operations of the system modifications as well as a recommended spares list.

## The Benefits

The modifications led by Nakuuruq Solutions brought the C-5 Maintenance Training Devices up-to-date and were completed on time, within budget, and passed all Air Force requirements. Including both simple graphics updates to complex systems installation and integration, these modifications will allow the Air Force to provide the most accurate simulations possible.