

# **LUCIX CORPORATION COMPANY OVERVIEW**

**2019, rev. -**

**This presentation contains general capabilities and product information and does not contain any controlled technical data as defined within the International Traffic in Arms Regulations (ITAR) or Export Administration Regulations (EAR).**

## ➤ Headquarters

**Lucix's 44,661k<sup>2</sup> Primary Facility  
is ~50 Miles from Los Angeles  
International Airport**

**800 Avenida Acaso  
Camarillo, CA 93012**



## ➤ Engineering Extension

**Lucix's 5,515'² Remote Facility  
is Located just south of  
Los Angeles International Airport**



- Lucix Corporation has been providing products and services to our prestigious and discerning customers since 1999.

THALES



COBHAM



Rockwell  
Collins

BAE SYSTEMS



Raytheon  
Integrated Defense Systems

NORTHROP GRUMMAN

LOCKHEED MARTIN

GENERAL  
DYNAMICS



Agilent Technologies

QinetiQ



SPACE SYSTEMS  
LORAL

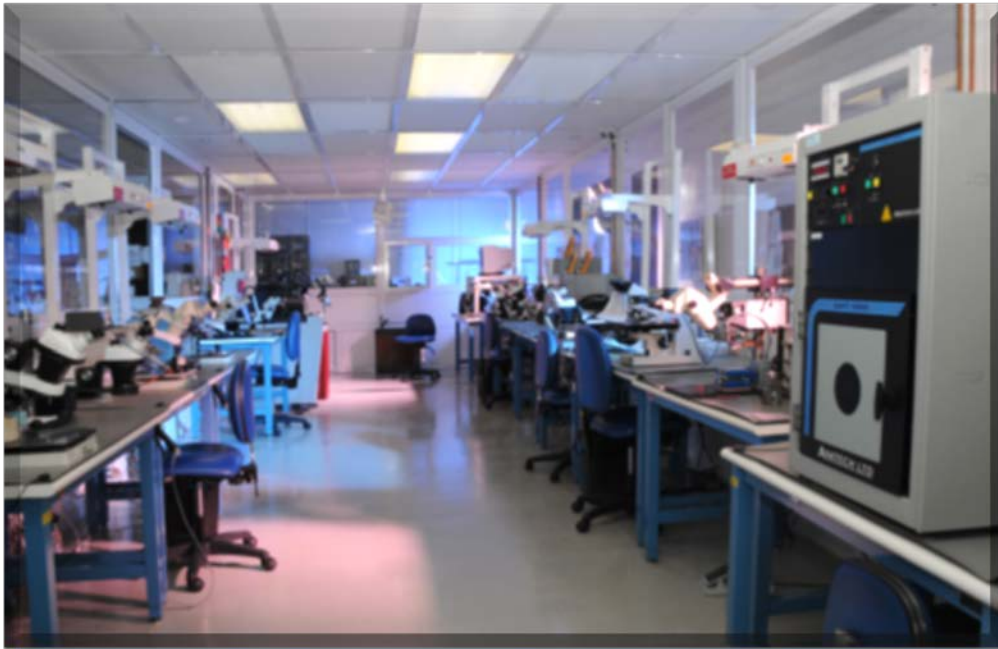


communications



## ➤ Clean Rooms

- ✧ 15,000 Square Feet
- ✧ Maintained as ISO 7 (Class 10,000)
- ✧ Capable of ISO 6 (Class 1,000)



ISO 14644-1  
(FED-STD-209E)

- Lucix maximizes the performance, repeatability, reliability and throughput benefits of precision automation in the manufacturing of our Integrated Microwave Assemblies and RF Hybrid Assemblies.



**Palomar 3500-II**  
automated die attachment



**Asymtek 403**  
automated epoxy dispensing



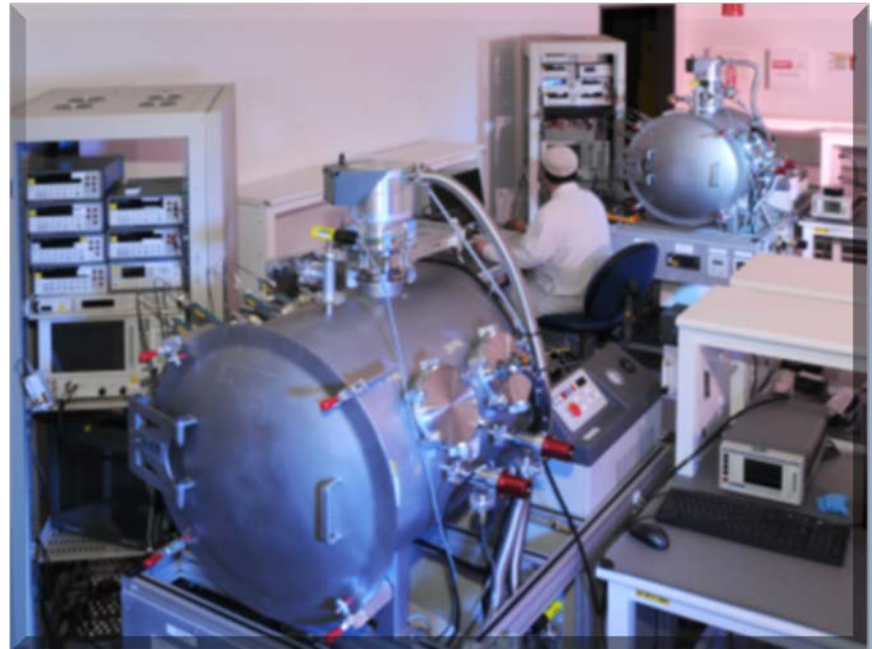
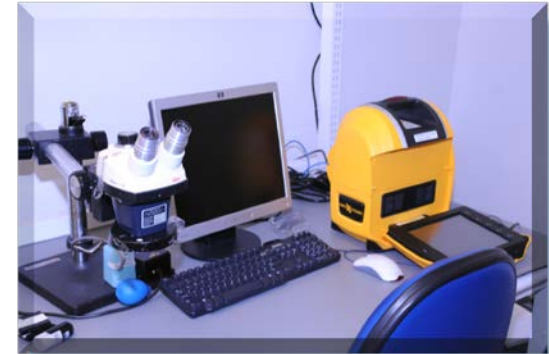
**Delvotec 6400**  
high reliability, high repeatability wire bonding

## ➤ In-House

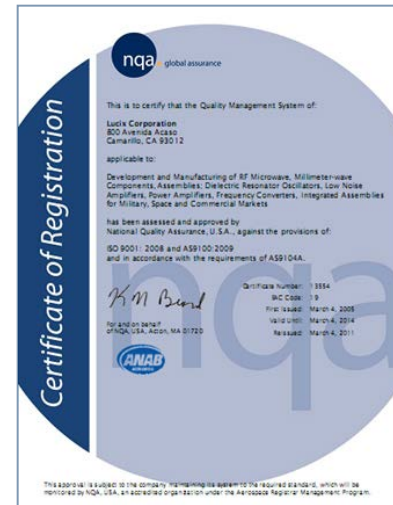
- ✧ XRF Component Screening
- ✧ Fine & Gross Leak Detection
- ✧ Vibration, Sine & Random
- ✧ Mechanical Shock
- ✧ Thermal Cycling
- ✧ Thermal Shock
- ✧ Thermal Vacuum
- ✧ PIND
- ✧ Burn-in

## ➤ Outside Facilities

- ✧ Pyrotechnic Shock
- ✧ EMI/RFI



- **Lucix maintains full compliance to the industry's toughest Quality standards**
  - ✦ **ISO9001: 2008 Registered**
  - ✦ **AS9100D: 2019 Certified**



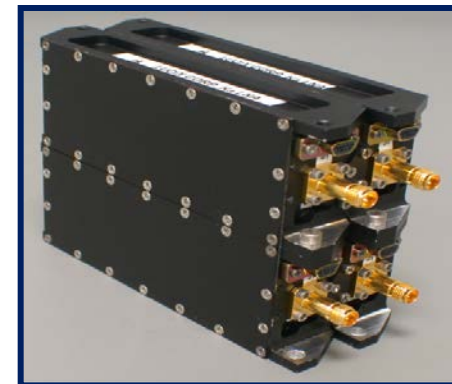
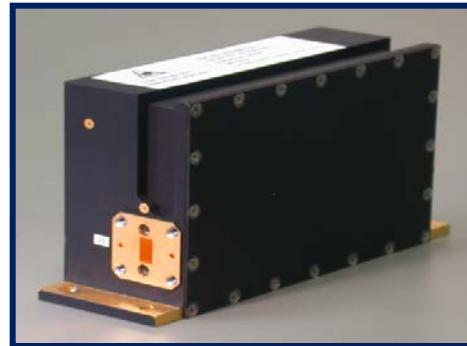
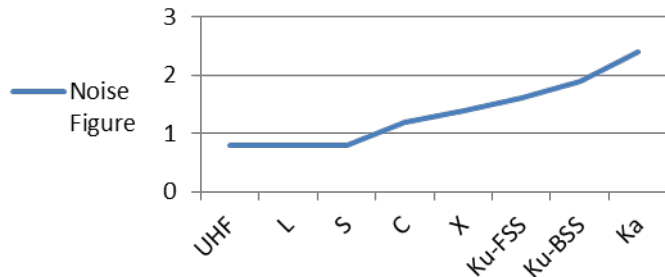
- **Lucix is a qualified supplier to most of the world's largest Military and Spacecraft system integrators**

# **PRODUCT HIGHLIGHTS**



## ➤ Capabilities

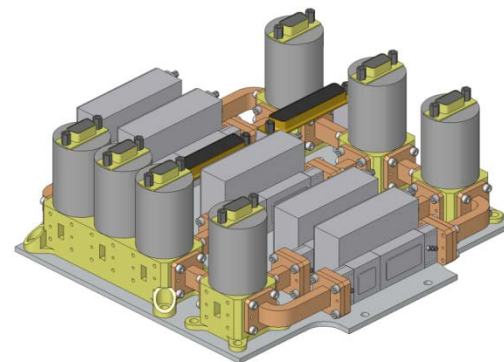
- ✧ Frequency UHF – Ka-Band
- ✧ Noise Figure +60C



- ✧ Power Consumption < 200 mW
- ✧ Low Mass
  - Self Contained Unit w/EPC <400 grams
  - Multipack Units w/o EPC
    - Ku <320 grams / slice
    - Ka <220 grams / slice
  - Multipack Units w/ Switches <460 grams / slice

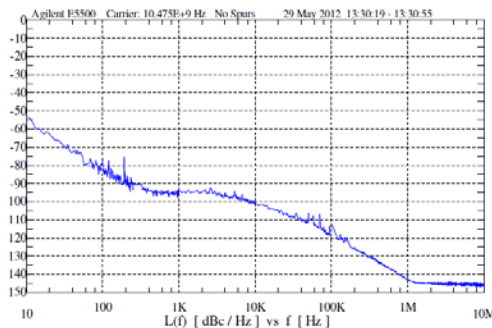
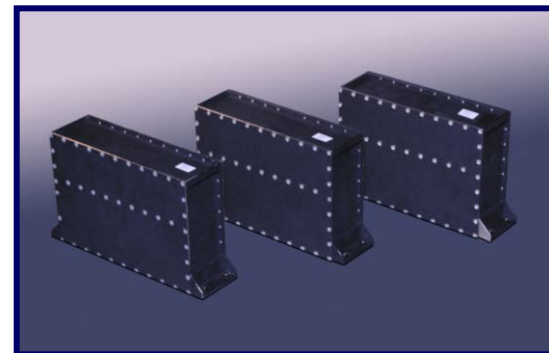
## ➤ Key Features / Options

- ✧ Internal DC-DC Converter
- ✧ Multipacks with Internal or Central Power Supply Unit (CPSU)
- ✧ Integral Redundancy Switching



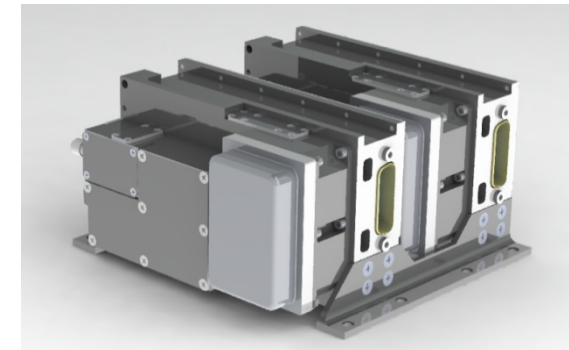
## ➤ Capabilities

- ✦ Master Local Oscillators
  - Frequency UHF – K-Band
- ✦ Master Reference Oscillators
  - Frequency 10MHz - 100 MHz (typical)
- ✦ Pointing Beacons
  - Frequency C – Ka-Band
- ✦ Frequency Synthesizers
  - Frequency L-Ka Band
- ✦ Typical Phase Noise (TCXO)



## ➤ Key Features / Options

- ✦ Small Footprint
- ✦ Integral DC-DC Converter
- ✦ Single / Dual / 3:1 Configurations
- ✦ OCXO (<2ppm) or TCXO (<4ppm) References

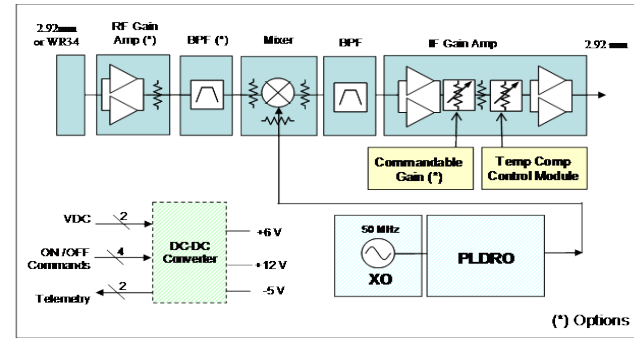


## ➤ Capabilities

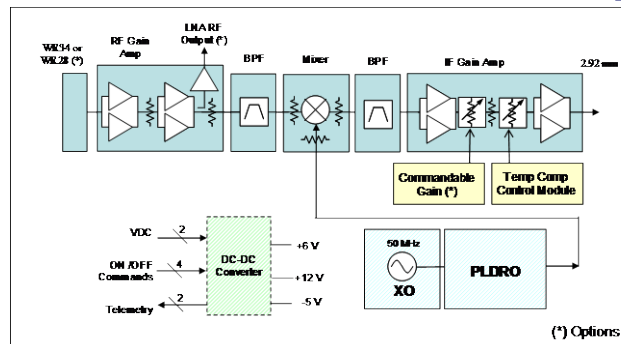
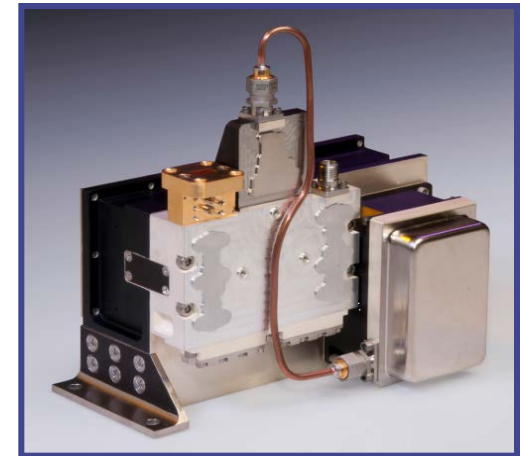
- ✦ Frequency UHF – Ka-Band
- ✦ Ultra-low phase noise DRO
- ✦ High Q internal filters
  - Provide excellent RF/IF gain reduction, improved out-of-band signal suppression and superior spurious and image rejection
- ✦ Typical Gain
  - Receiver up to 67 dB
  - Converters 20 - 35 dB
- ✦ Excellent Linearity
- ✦ Power Consumption
  - Converter <550 mA
  - Receiver <750 mA
- ✦ Small Footprint
  - Mass <650 grams

## ➤ Key Features / Options

- ✦ Internal DC-DC Converter
- ✦ Adjustable Gain
- ✦ LNA RF Output



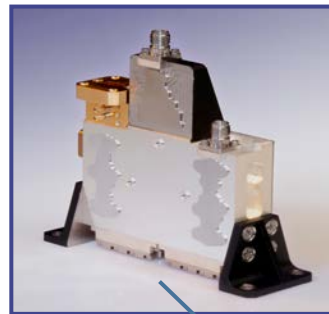
Converter Block Diagram



Receiver Block Diagram

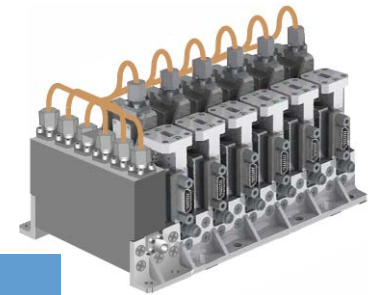
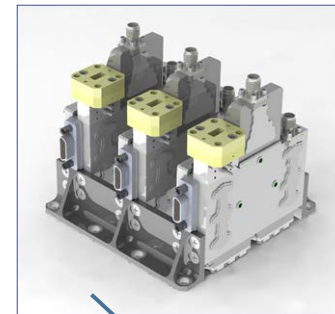
## ➤ Capabilities

- ✧ Frequency Ku & Ka-Band
- ✧ Ultra-low phase noise DRO
- ✧ High Q Internal Filters
  - Provide excellent RF/IF gain reduction, improved out-of-band signal suppression and superior spurious and image rejection
- ✧ Typical Gain
  - Receiver up to 67 dB
  - Converters 20 - 35 dB
- ✧ Excellent Linearity
- ✧ Individual Slice Control
  - Voltage Regulation
  - ON/OFF Command
  - Telemetry
- ✧ Power Consumption (typ. Payload 10 LO's / 60 CH's)
  - <160 mA / Converter slice Integral LO Distribution and inclusive of MLOs and CPSUs
  - <295 mA / Receiver slice Integral LO Distribution and inclusive of MLOs and CPSUs
- ✧ Low mass
  - <300 grams / slice Integral LO Distribution
  - <600 grams slice Integral LO Distribution and inclusive of MLOs and CPSUs
- ✧ Small Footprint
  - 7.2" x 3.8" per 6-pack with LO Distribution



## ➤ Key Features / Options

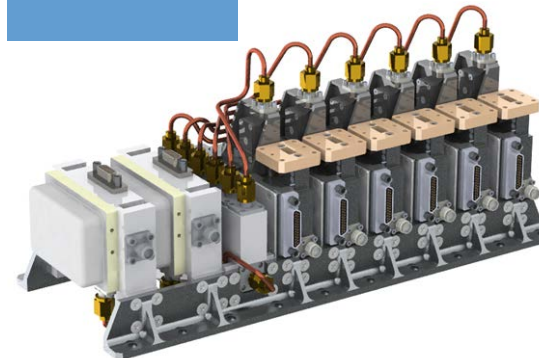
- ✧ Powered via External CPSU
- ✧ Adjustable Gain
- ✧ LNA RF Output
- ✧ Integral LO Distribution
- ✧ Integral MRO or MLO



Single Slice

3-pack

6-pack  
with Integral  
LO Distribution



6-pack  
with Integral  
2:1 MLO

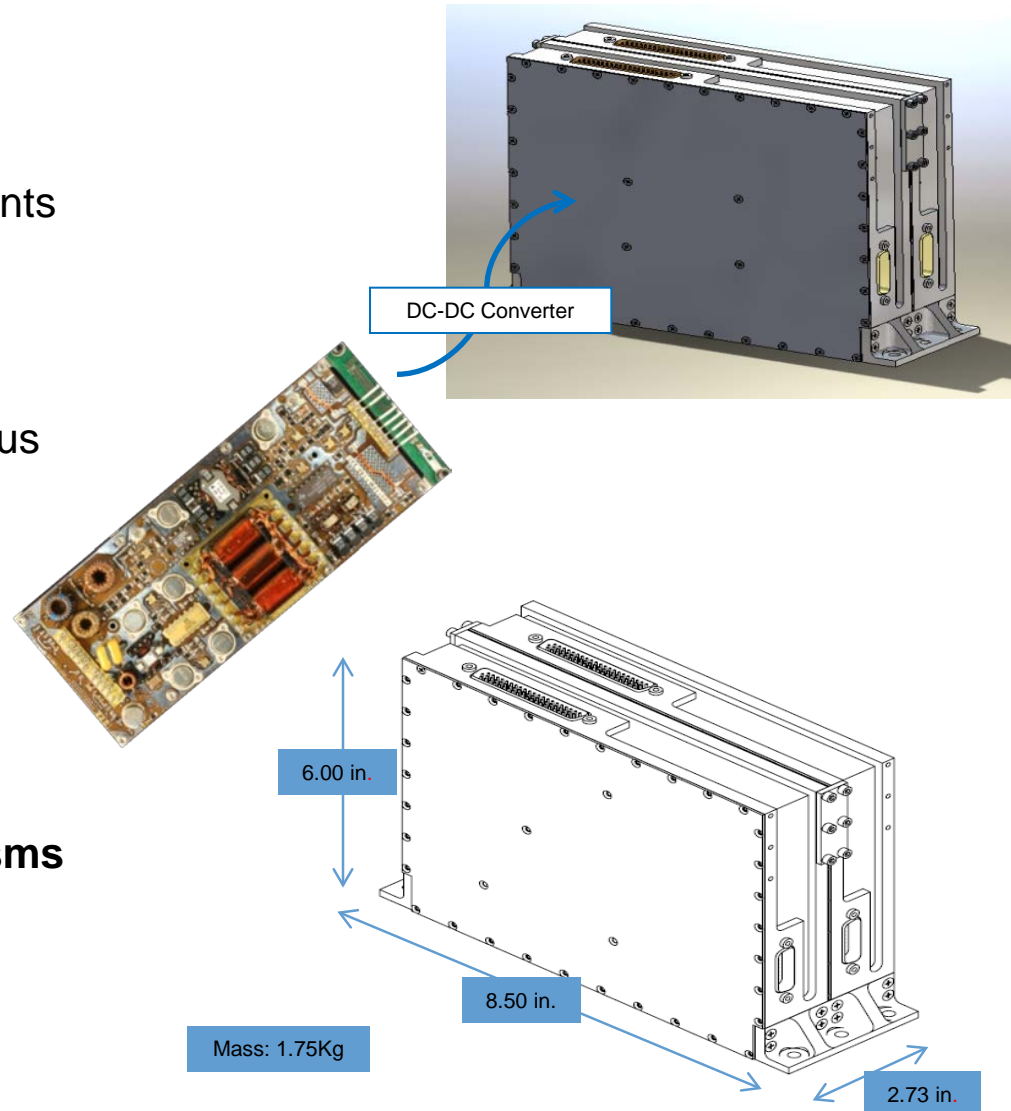


## ➤ Capabilities

- ✧ **Primary & Redundant Slices**
  - Outputs cross-strapped
  - Fuse distribution network prevents failure propagation
- ✧ **Independent On/Off Command**
  - Redundant Discrete High Level commands
  - Provides redundant On/Off status telemetry
- ✧ **Power Capability 100 watts**
  - Power 16 Receivers typical
  - Power 22 Converters typical
  - Power 60 LNA's typical

## ➤ Key Features / Options

- ✧ **NO Single Point Failure Mechanisms**



# **NOTABLE DEFENSE PROGRAMS**

## ➤ Family of Advanced Beyond Line-of-Sight Terminal (FAB-T)

### ✱ Lucix Initially Developed 6 critical RF Modules

#### ▪ AGRF Assembly

- Dielectric Resonant Oscillators (2 X-Band Variants)
- Reference Amplifier/Splitter (VHF)
- Test Translator Integrated Microwave Assembly (V to K-Band)

#### ▪ CHIF Assembly

- Dielectric Resonant Oscillators (2 C-Band Variants)

### ✱ Lucix Requested to Develop 2 Additional Modules

#### ▪ CHIF Assembly

- Receive Integrated Microwave Assembly
- Transmit Integrated Microwave Assembly

Assy	RF/Microwave Assy	Delivered								Planned							Total
		2005	2006	2007	2008	2009	2010	2011	S/T	2014	2015	2016	2017	2018	2019	S/T	
CHIF	IMA, Receive		3	20	15	3	9	9	59	46	70	46	31	74	69	336	395
	IMA, Transmit		26	6	6	5	7	8	58	46	70	46	31	74	69	336	394
	DRO 1, C-Band		35	1	5		8	9	58	46	70	46	31	74	69	336	394
	DRO 2, C-Band		34	1	7		9	9	60	46	70	46	31	74	69	336	396
AGRF	Amplifier, Distribution		29	1			8	5	43	43	57	37	25	58	63	283	326
	IMA, Downconverter		29	1	1	0	7	6	44	43	57	37	25	58	63	283	327
	DRO 3, X-Band	18	12		0		7	5	24	43	57	37	25	58	63	283	307
	DRO 4, X-Band	17	12			1	7	3	23	43	57	37	25	58	63	283	306
Total		35	180	30	34	9	62	54	369	356	508	332	224	528	528	2476	2845

Various Ground Resources



VC-25  
"Air Force One"  
Commander In Chief



E-4  
"Nightwatch"  
USAF



E-6  
"Mercury"  
USN



B-2  
"Spirit"



B-52  
"Stratofortress"



RC-135  
"Rivet Joint"





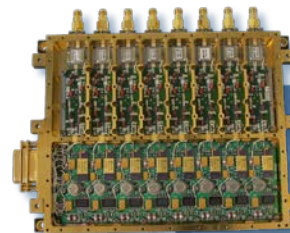
# MOBILE USER OBJECTIVE SYSTEM (MUOS)

## ✧ Voice, Video and Data to the Warfighter



## Terrestrial (General Dynamics)

- RF/Microwave Amplifiers
- Multi-Channel RF Power Monitors



## Spaceborne (Lockheed Martin & Boeing)

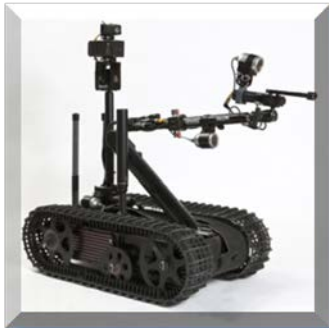
- 30GHz/2GHz Receiver





## ➤ Multi-Configuration, Multi-Mission Robot

- ✦ Standard: Improvised Explosive Device (IED) Disarming and Explosive Ordinance Disposal (EOD)
- ✦ SOTAL: Reconnaissance Missions
- ✦ SWORDS: Small Arms Combat and Guard Roles
- ✦ HAZMAT: Hazardous Environment Operation



**2,665+ Link Amplifiers  
Provided To-Date**



## NUMEROUS ADDITIONAL PROGRAMS



**MH-60S Armed Helicopter**  
191x 29GHz DROs



Many of our >36,000  
components are designated for  
unidentified programs.



**AN/BLQ-10(V) Wideband Radar**  
89x Ku-Band DROs &  
89x Ka-Band DROs



**KDX-III Korean AEGIS Destroyer**  
91x 2-18GHz Amplifiers &  
81x 8-18GHz Amplifiers



**Radar Beacon/  
IFF Transponder**  
4,551x X-Band DROs &  
3,719x Ku-Band DROs



**THANK YOU  
FOR YOUR TIME**

**Lucix Corporation  
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**805-987-6645**