

# Company Introduction

June 2018

**M 3 S Y S, Inc.**

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# 1. Executive Summary

❑ M3SYS is an enterprise specialized in producing defense industry components, satellite payloads and RF products.

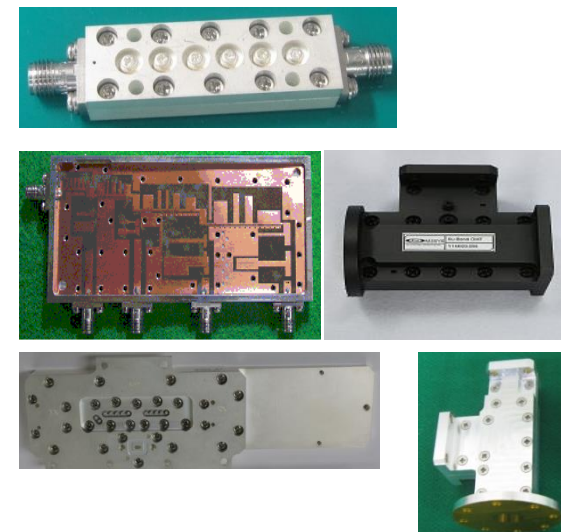
## ❑ Business Field



- Airborne Electronic Warfare Equipment
- RF Components of radar systems



- Satellite Payload Passive Components
- Satellite/Ground Data communication Modules



- Ultra high frequency / mm-Wave products

## 2. Major Design Skills & Design Heritage

### 2-1. Filters & Diplexers

#### Filters

❑ A device which is used to filter on the signals transmitted or received.

#### Type of Filters

- LPF (Low Pass Filter)
- HPF (High Pass Filter)
- BPF (Band Pass Filter)
- BRF (Band Rejection Filter)

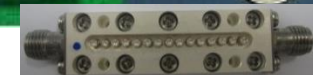
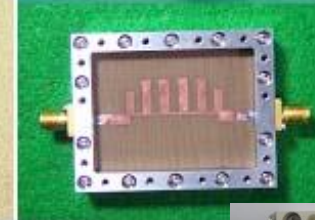
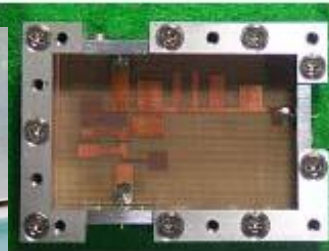
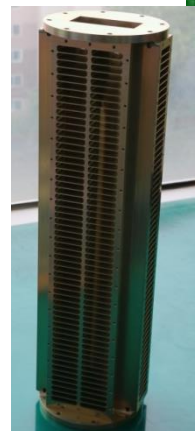
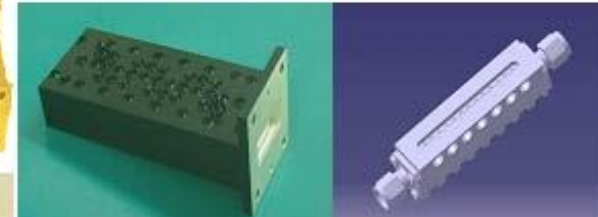
#### Type of Filters (By materials)

- Cavity Type
- Waveguide Type
- PCB Type
- LC Type

#### Diplexers

❑ A device that allows transmitter and receiver to share a common communications channel without interfering each other.

❑ Consists of a BPF which passes transmitter frequencies, and the other BPF which passes receiver frequencies



## 2. Major Design Skills & Design Heritage

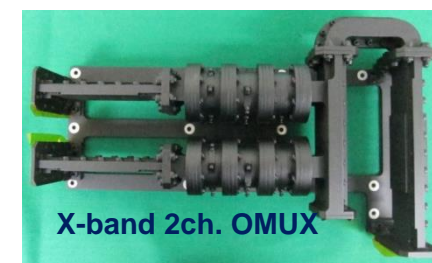
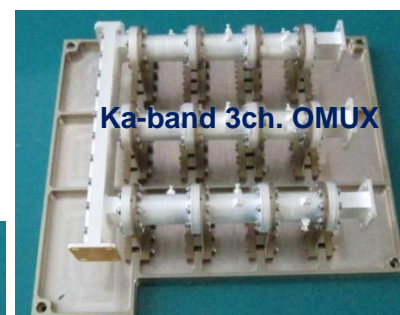
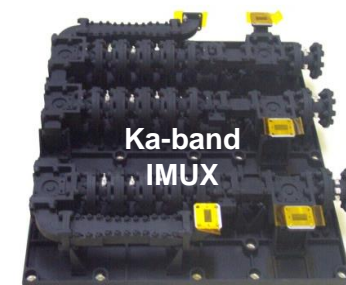
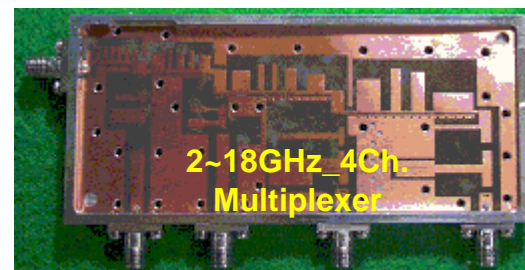
### 2-2. Channel Filter / Multiplexer

#### Summary

- ❑ A Channel Filter is a device consisted of multiple filters, to use multiple channels.
- ❑ A Multiplexer is a device consisted of LPF and HPF. It selects one input signal and sends multiple signals to the output.

#### Functions

- ❑ Distributes one signal to each filter.
- ❑ A Combiner gathers signals from filters and makes one signal.
- ❑ Multiplexer does not use power divider, power combiner, or Circulator, makes its insertion loss excellent.



## 2. Major Design Skills & Design Heritage

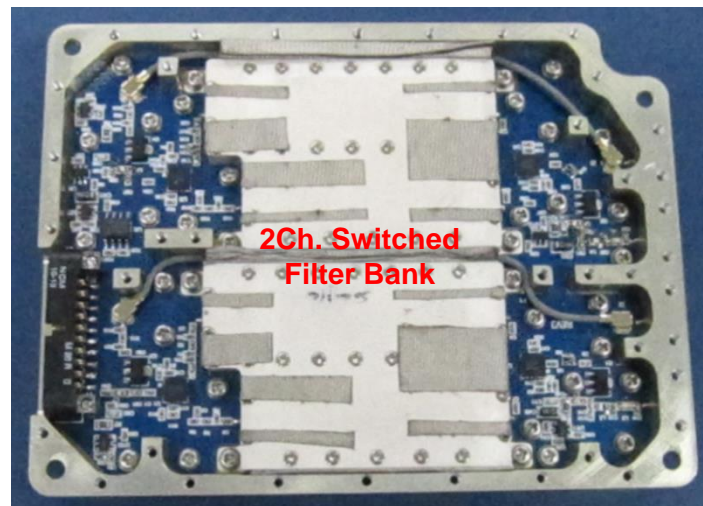
### 2-3. Module / Subsystem

#### Summary

- ❑ Module and Subsystem Integration based on Passive Components
- ❑ Pin Diode Switch design
- ❑ Able to design and produce any parts in need

#### Structure

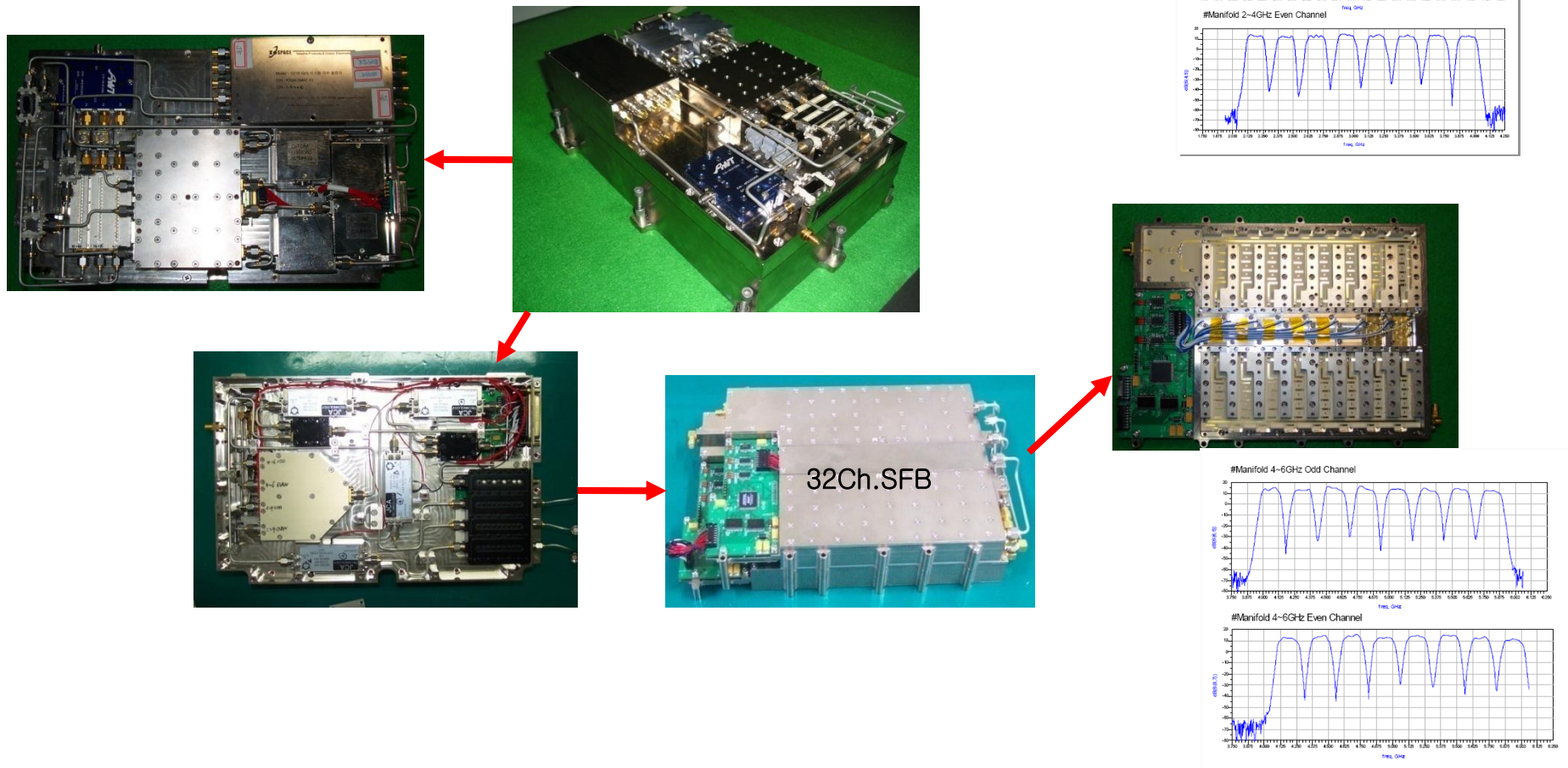
- ❑ Other Passive Components
  - Power Divider / Directional Coupler (Broadband)
- ❑ Switched Filter Bank





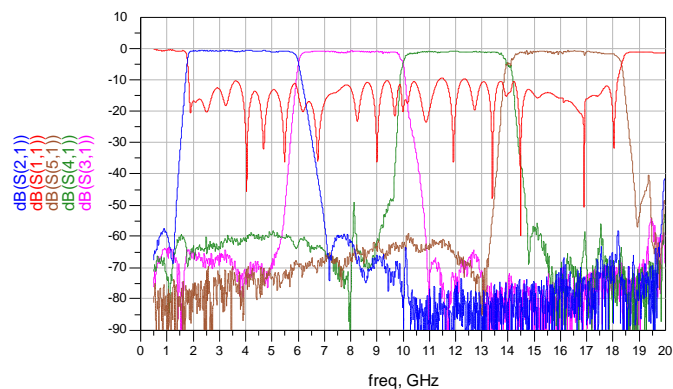
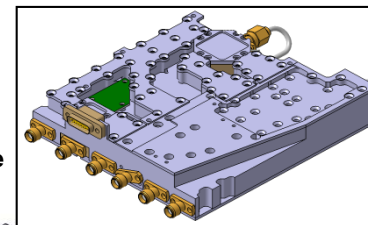
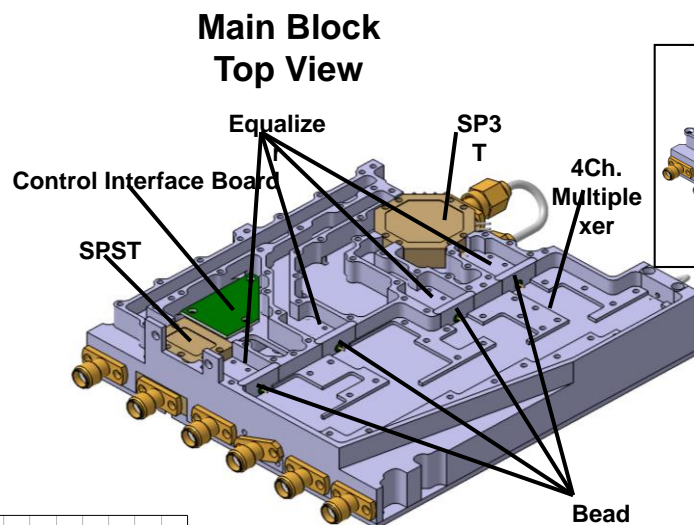
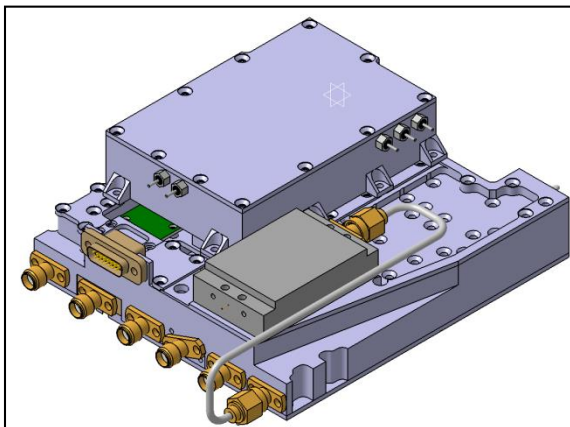
## 2. Major Design Skills & Design Heritage

### 2-3-1. 32 Channel Switched Filter Bank

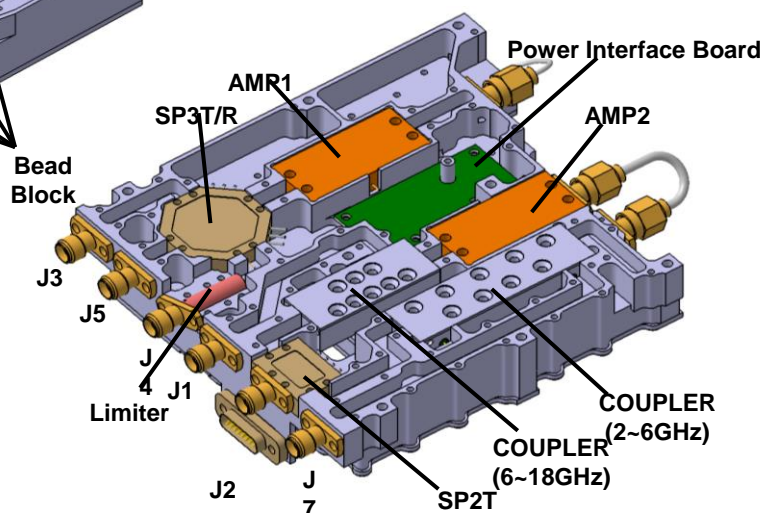


## 2. Major Design Skills & Design Heritage

### 2-3-2. Switched Filter Bank using 4 Channel Multiplexer - Heritage



Electrical Characteristic for 4ch. Multiplexer

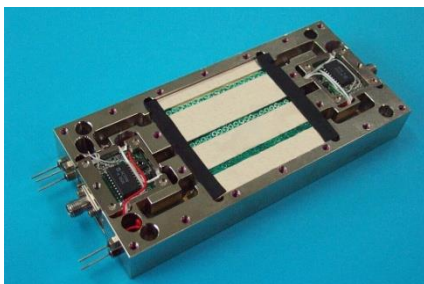
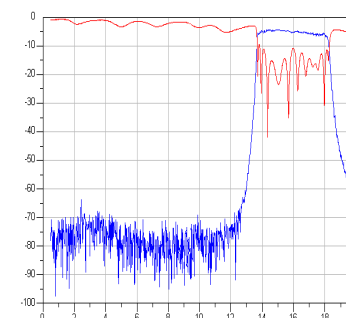
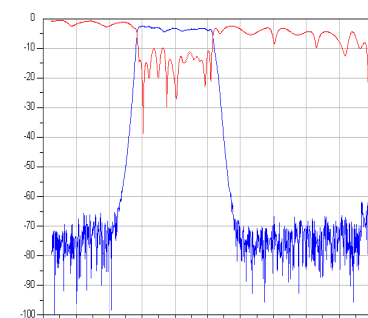
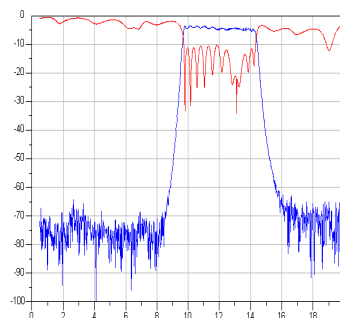
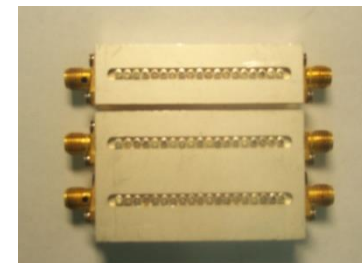
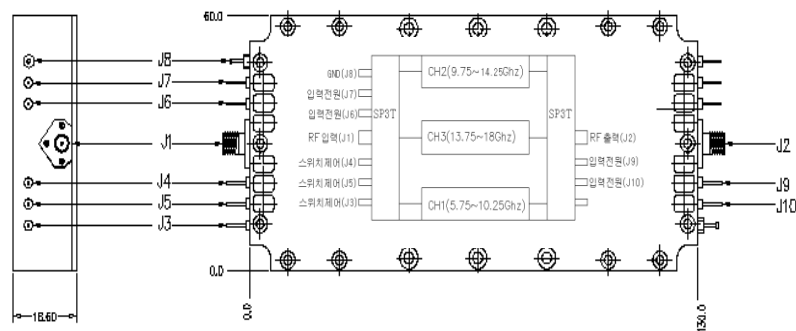




## 2. Major Design Skills & Design Heritage

### 2-3-3. 3 Channel Switched Filter Bank(5.75~18GHz) - Heritage

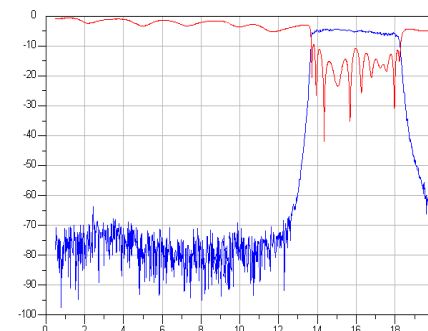
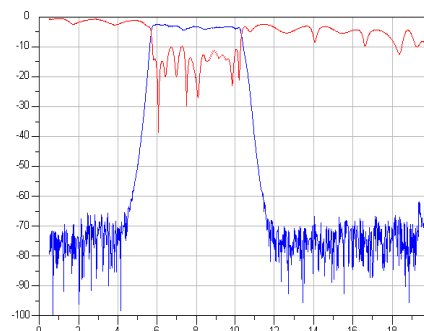
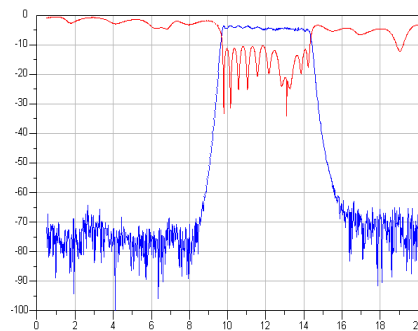
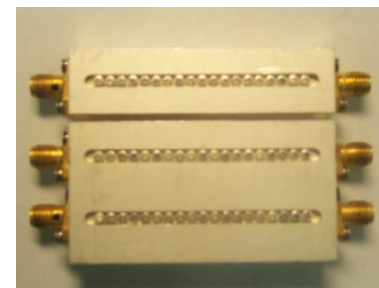
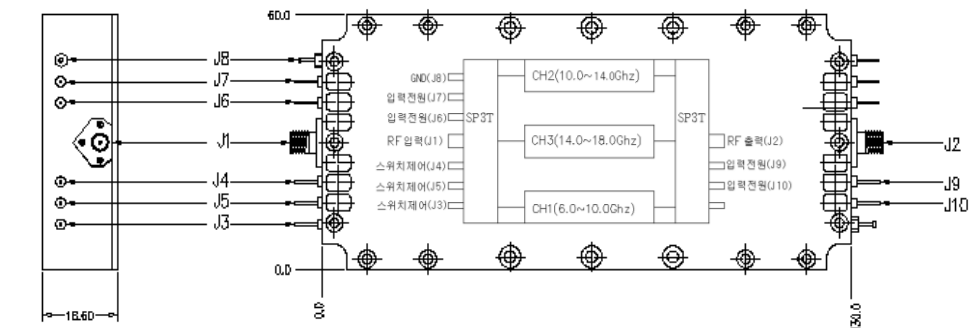
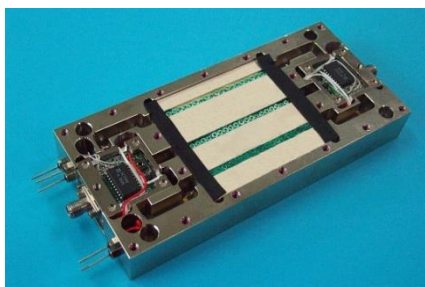
Freq. Range	Freq. of 30dB Attenuation	Freq. of 60dB Attenuation
5.75~10.25GHz	$\geq 5150\text{MHz}$	$\geq 4350\text{MHz}$
	$\leq 10850\text{MHz}$	$\leq 11650\text{MHz}$
9.75~14.25GHz	$\geq 9150\text{MHz}$	$\geq 8150\text{MHz}$
	$14850\text{MHz}$	$\leq 15850\text{MHz}$
13.75~18GHz	$\geq 13150\text{MHz}$	$\geq 11950\text{MHz}$
	$\leq 18850\text{MHz}$	$\leq 20050\text{MHz}$



## 2. Major Design Skills & Design Heritage

### 2-3-4. 3 Channel Switched Filter Bank(6.0~18GHz) - Heritage

Freq. Range	Freq. of 30dB Attenuation	Freq. of 60dB Attenuation
6 ~ 10GHz	5400MHz	4600MHz
	10600MHz	11400MHz
10 ~ 14GHz	9400MHz	8400MHz
	14600MHz	15600MHz
14 ~ 18GHz	13400MHz	12200MHz
	18600MHz	19800MHz



## 2. Major Design Skills & Design Heritage

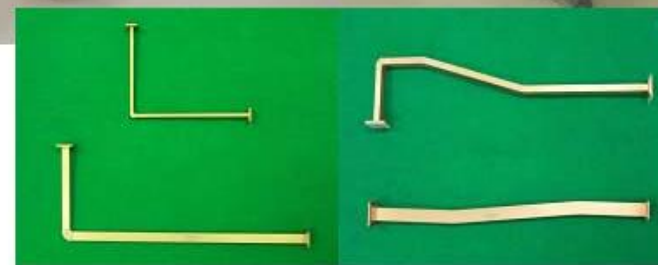
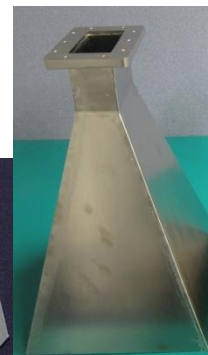
### 2-4. Antenna Feeder Parts / Other Parts

#### Summary

- ❑ Korea Sat #5 Antenna Feeder & Passive Components(IMUX/IFA)
- ❑ Self-Design / Manufacturing Capability(Clean room)
- ❑ Ground Station Passive Components

#### Structure

- ❑ Antenna Feeder (Ku/Ka-band)
  - Corrugated Horn
  - Polarizer
  - OMT
- ❑ Passive Component(Ku/Ka-band)
  - IFA(BPF + Directional Coupler + Adaptor + Term.)
  - IMUX(Ch. Filter + Iso. + Circulator + Equalizer + LPF)
- ❑ Other Part
  - Waveguide Run
  - Rotary Joint



### 3. Products

Filter Type	Interdigital & Combine BPF	
Project	Electronic Warfare	
Item	BPF for Filter Bank	
Products	BPF	6.0 ~ 18.0 GHz BPF , 8 ch
		18.0 ~ 40.0 GHz BPF, ch4 / ch2
		7.5 ~ 9.0 GHz BPF
		10.0 ~ 12.0 GHz BPF
		5.0 ~ 18.0 GHz BPF, 13ch
Customer	LPF+Notch	18.0 GHz LPF + Notch
	Broadern, Gigalane	



Ch1 of 6.0 ~ 18.0 GHz BPF



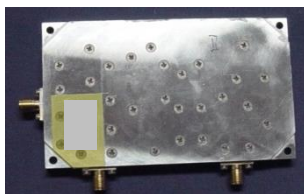
7.5 ~ 9.0 GHz BPF



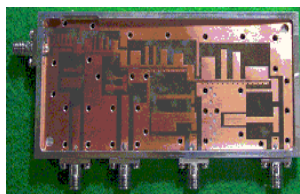
Ch4 of 18.0 ~ 40.0GHz BPF

### 3. Products

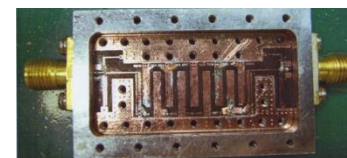
Filter Type	PCB (Suspended)
Project	Electronic Warfare: SONATA, Lynx ESM
Item	Diplexer, HPF, 4ch Multiplexer, Etc.
Products	2.0 ~ 18.0 GHz (2.0 ~ 6.0, 6.0 ~ 18.0 GHz)
	Diplexer 1.0 ~ 18.0 GHz (1.0 ~ 8.0, 8.0 ~ 18.0 GHz)
	2.8 ~ 18.0 GHz
	1.2 ~ 15.0 GHz HPF
	2.4835 ~ 18.0 GHz HPF
Customer	2.0 ~ 18.0 GHz 4ch Multiplexer
	LG, Various Overseas Markets



2.0 ~ 18.0 GHz Diplexer



2.0 ~ 18.0 GHz 4ch Multiplexer



6.0 ~ 10.0 GHz BPF



3. Products

Filter Type	Cavity Filter (Comblne)	
Project	Military Satellite	
	COMS Mobile Communications	
	Various Localization Projects	
Item	PLDRO Module BPF	6.0 ~ 6.6 GHz, 6.65 ~ 7.25 GHz 17.25 ~ 19.25 GHz, 28.75 ~ 29.35 GHz
	Mobile communications	10.7 ~ 12.75 GHz, 14.0 ~ 15.4 GHz
	X-band BPF	7.25 ~ 7.75 GHz, 7.9 ~ 8.4 GHz
	Transceiver BPF	7.9 ~ 8.4 GHz, 7.85 ~ 8.45 GHz, 13.75 ~ 14.5 GHz, 17.3 ~ 17.8 GHz, 30.0 ~ 31.0 GHz, 43.45~ 45.55GHz
Customers	Genohco, Genmixtech, ETRI	



Transceiver 30~31GHz BPF



7.5 GHz BPF



### 3. Products

Filter Type	Cavity Filter (Comblne)	
Project	mm-Wave Band Pass Filter	
Item	PLDRO Module BPF	6.0 ~ 6.6 GHz, 6.65 ~ 7.25 GHz 17.25 ~ 19.25 GHz, 28.75 ~ 29.35 GHz
	Mobile communications	10.7 ~ 12.75 GHz, 14.0 ~ 15.4 GHz
	X-band BPF	7.25 ~ 7.75 GHz, 7.9 ~ 8.4 GHz
	Transceiver BPF	7.9 ~ 8.4 GHz, 7.85 ~ 8.45 GHz, 13.75 ~ 14.5 GHz, 17.3 ~ 17.8 GHz, 30.0 ~ 31.0 GHz
	Hynix	40.0~45.0 GHz, 45.0~50.0 GHz, 50.0~55.0 GHz 55.0~60.0 GHz, 60.0~65.0 GHz, 65.0~70.0 GHz
Customers	Genohco, Genmixtech, ETRI	



40~45 GHz BPF



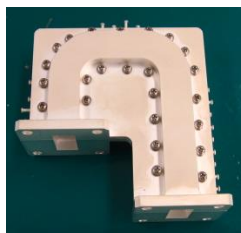
50~55 GHz BPF



60~65 GHz BPF

### 3. Products

Filter Type	Waveguide Filter	
Project	X-Band / Ka-Band MILSAT , Ku-band	
	COMS Mobile Communications	
	Video Transmitter for Subway	
Item	Waveguide BPF	7.25 ~ 7.75 GHz (CPR112/137), 7.9 ~ 8.4 GHz (CPR112)
		20.0 ~ 21.0 GHz (SMA), 30.0 ~ 31.0 (UG-599/U)
		10.7 ~ 12.75 GHz (UBR120)
	Mobile communications	18.81 ~ 18.93 GHz (SMA/WR-42)
		19.15 ~ 19.27 GHz (SMA/WR-42)
		30.085 ~ 30.885 GHz BPF (UG-599/U)
Customers		20.355 ~ 21.155 GHz BPF (UG-599/U)
		10.7 ~ 12.75 GHz OMT
		Genohco, Genmixtech, ETRI



11.725 GHz BPF



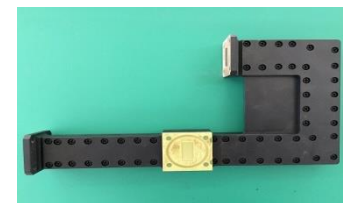
30 ~ 31 GHz BPF



Ku-Band OMT



Ku-Band Diplexer

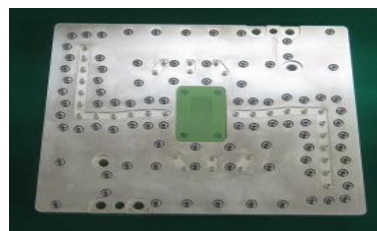


### 3. Products

Filter Type	Waveguide Diplexer
Project	DMR
Item	Waveguide Diplexer 39GHz (UG-599/U), 22GHz (UBR220) 17GHz, 18GHz (UBR220) 14GHz, 15GHz (UBR140) 12GHz, 13GHz (UBR120) 8.2 ~ 8.3 GHz (WR75/SMB) 7.1 ~ 7.2 GHz (WR75/SMB) 42GHz (UG-383/U) 39GHz (UG-599/U) 10.5 GHz (UBR120) 7GHz (WR112/SMA) 72~75GHz, 81.5~85.5GHz(WR-12)
Customers	Genmixtech, ACE



8 GHz  
Waveguide Diplexer



10.5 GHz  
Waveguide Diplexer



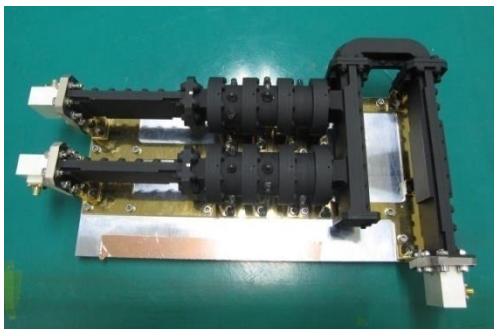
39 GHz  
Waveguide Diplexer



70/80GHz  
Waveguide Diplexer

### 3. Products

Type	Output / Input Multiplexer	
Project	MiPAD (Military Payload) : Development of Korea's new Military Satellite	
Item	Output Multiplexer	7.25 ~ 7.75 GHz _ 2 Channel (WR112) 20GHz_7Channel(WR-51)
	Input Multiplexer	20GHz_7Channel(WR-42)
Customers	ADD / ETRI	



X-band 2Ch Output Multiplexer



Ka-band 7Ch Output Multiplexer

Ka-band  
Input Multiplexer


- ETRI (**E**lectronics and **T**elecommunications **R**esearch **I**nstitute)
- ADD (Agency of Defense Development)
- Both agencies are Korean government organizations.



## 4. Clients

**Intellian**<sup>®</sup>

**ETRI** 21세기 세계 최고 정보통신 연구기관  
한국전자통신연구원

 국방과학연구소  
Agency for Defense Development

 (주)유텔  
Microwave Solution For You

 LIG 넥스원

 SAMSUNG | THALES

 큐니온

 SI 씨트랙아이  
satrec initiative

 High Gain Antenna

**LICT**

**XMW**

 JungwooEng

**Cytron**

 GENMIX  
Microwaves & Sensor

 Broadern  
Broadband wireless technology

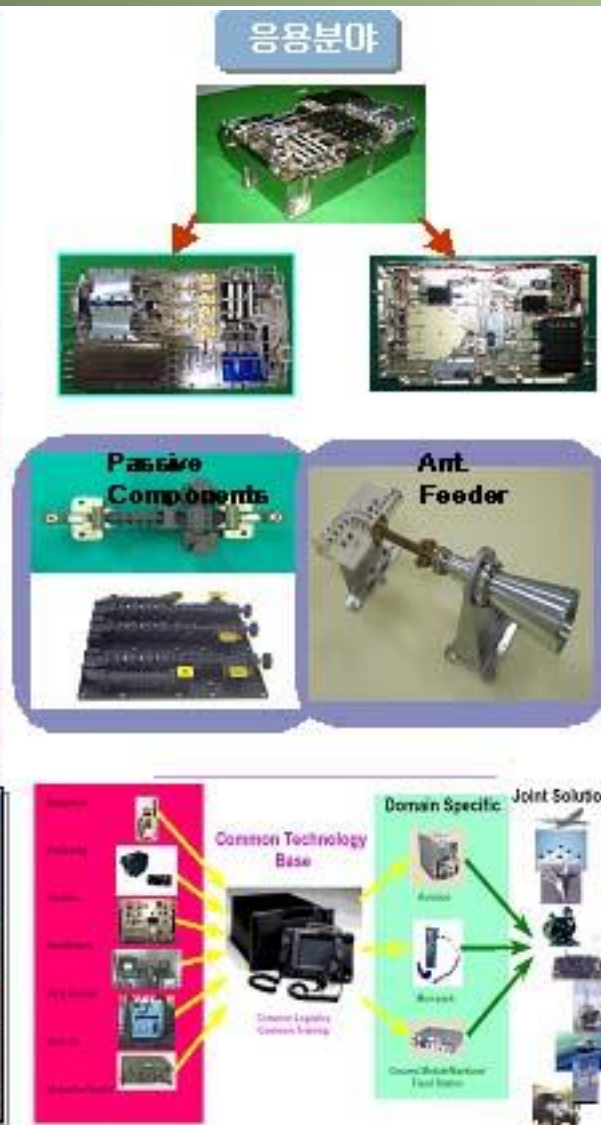
**GENOHCO**

## 5. Business Area

### 전자전분야



### 응용분야

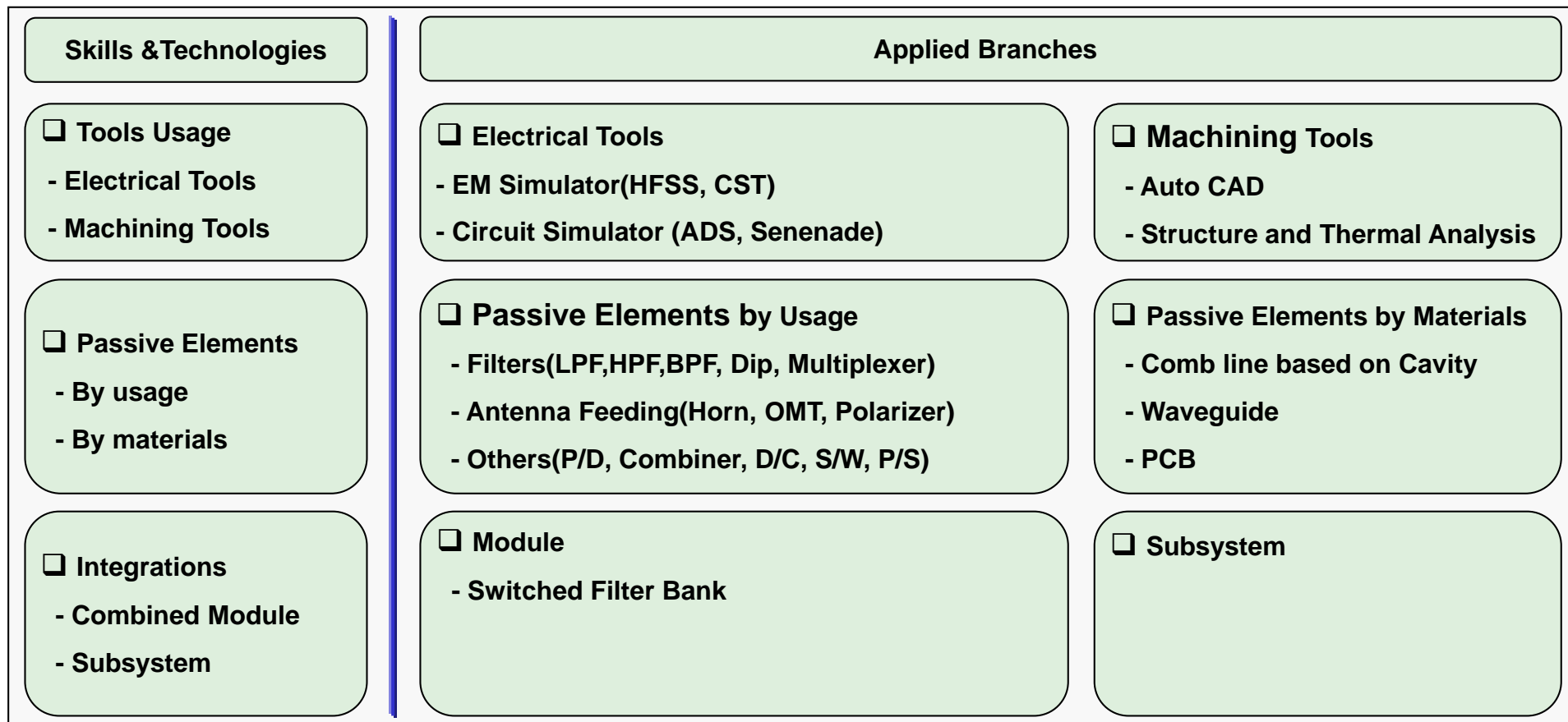


### Items

- ☐ TAG ELINT POD
  - 3-Band, 4-Band Filters for Filter Bank
  - Filters for Frequency Synthesizer Filter Bank
- ☐ Baekdu Project (Korean Reconnaissance Aircraft Project)
- ☐ 2ch Filter Bank (UAV)
- ☐ Satellite Payload (MILSAT)
  - Passive Components
  - Antenna Feeder
- ☐ Satellite ground system (Ground Control Center)
- ☐ RF Front end Module and components for data link Integrated Communication Systems

## 6. Skills & Technologies

- ☐ Capable of self-designing and manufacturing RF Passive Components
- ☐ Module and Sub-System design and manufacture
- ☐ Broadcasting, Communication Satellite Payload
- ☐ Components and Control Technology based on Chips



## Company Profile

<b>Company Name</b>	<ul style="list-style-type: none"> <li>▪ M3SYS,Inc. (www.m3sys.com)</li> </ul>
<b>Address</b>	<ul style="list-style-type: none"> <li>▪ #605, Metroplaza B/D, Byeongjeom Ro37-6, Hwaseong-si, Gyeonggi-do, South Korea</li> </ul>
<b>President</b>	<ul style="list-style-type: none"> <li>▪ Suh, Joon-suk</li> </ul>
<b>Date of Establishment</b>	<ul style="list-style-type: none"> <li>▪ Established: 7 September 2006</li> <li>▪ Incorporated: 1 August 2014</li> </ul>
<b>Field of Business</b>	<ul style="list-style-type: none"> <li>▪ RF Passive Elements / RF Module / RF Subsystem</li> </ul>

