

Micro-Projector

March 2007

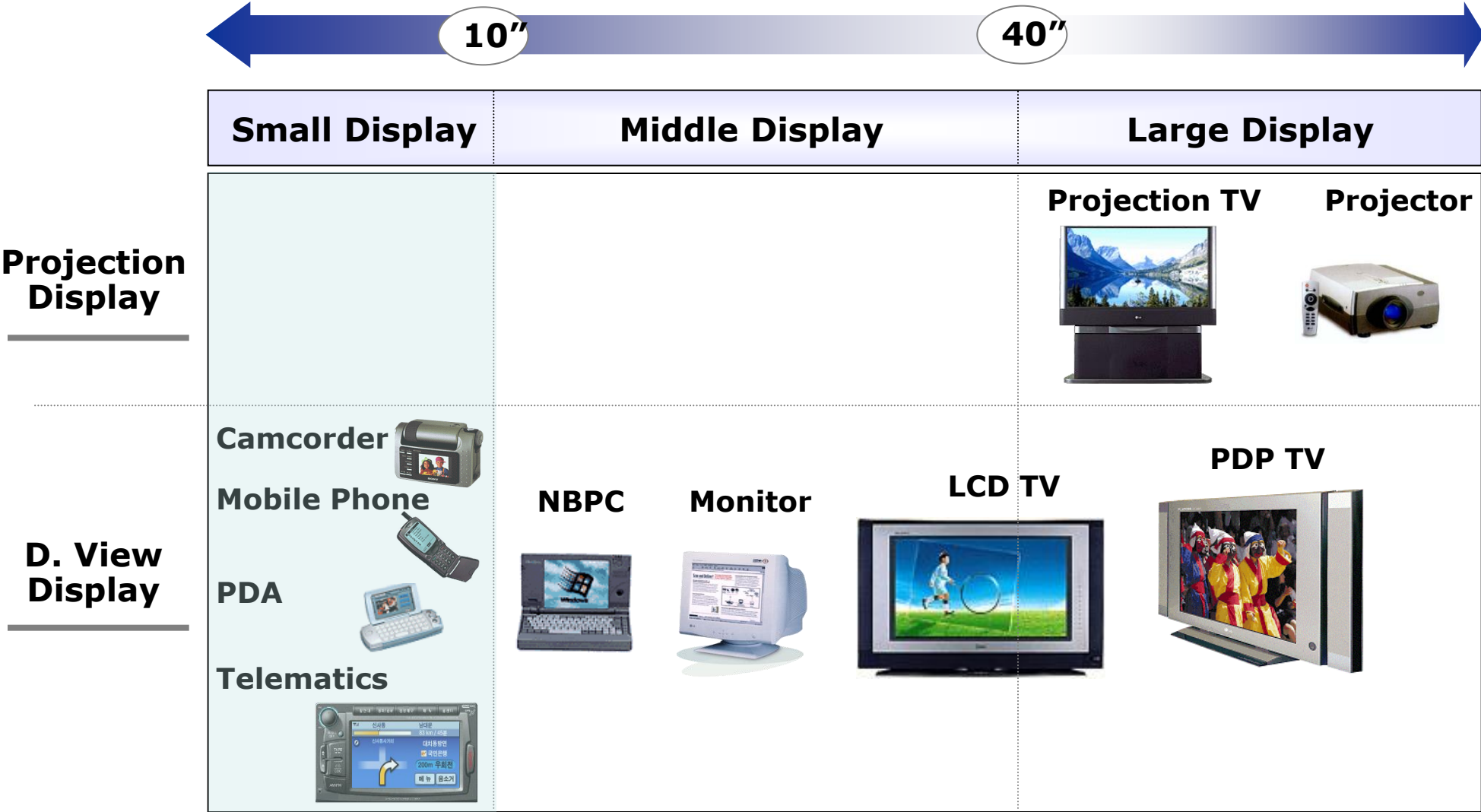
Purpose

BACKGROUND:

While advancements in IC chip complexity and other infrastructures led to a rapid growth in data processing capability and contents (DMB or UCC) of **Mobile Products**, the path toward a larger display has been confined by the size limitations of the **Mobile Products**.

PROPOSAL:

Thus, we propose to pursue a new business opportunity by developing a new line of **compact, high resolution Projection Display Products** that will allow connectivity to **Mobile Phones** and **Mobile Products**.

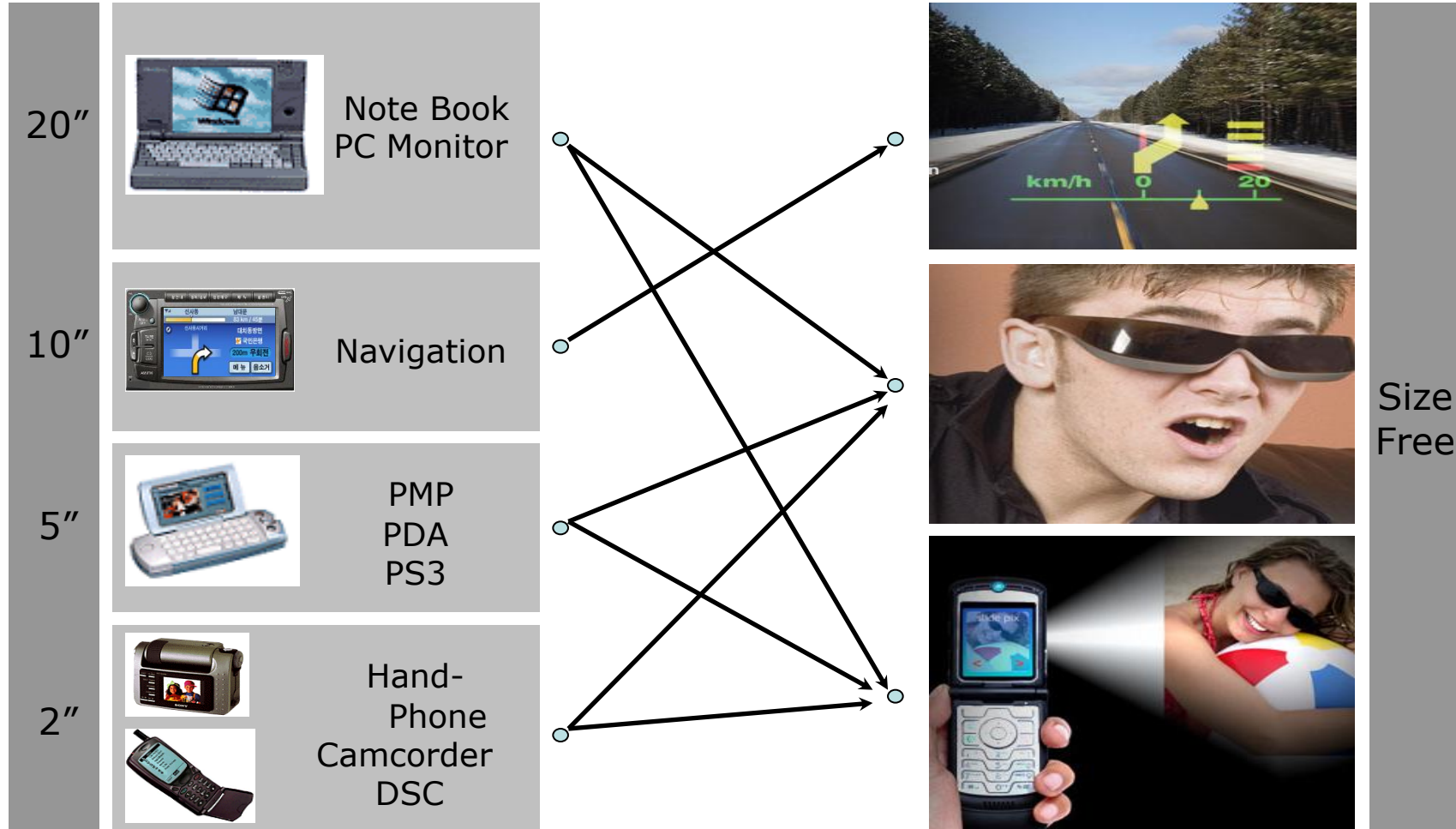



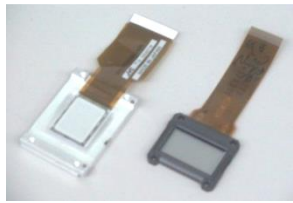
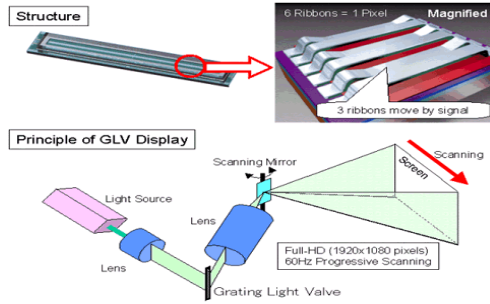
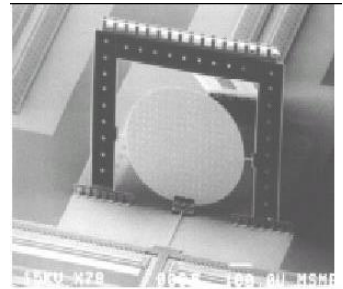
2. Display Positioning

2. Personal Display

Current

Future



~2000	2001~2010	2005~2010	2008~
2 Dimensional		1 Dimensional	Point Panel
<p>CRT</p>  <p>Hitachi Panasonic</p>	<p>MD</p>  <p>Sony, Epson TI JVC, SpatiaLight</p>	<p>GLV</p>  <p>Sony, SLT</p>	<p>MEMS Scanner</p>  <p>Microvision</p>

GLV : Grating Light Valve

3. Technology Trend

2. Panel Comparison

	CRT	MD Panel			1-D	Point
		LCD	DLP	LCoS		
Size	Big	Small	Small	Small	Very Small	Very Small
Resolution	Low	High	High	High	Middle	Middle
Price	Low	High	High	Low	Low	Low
Efficiency	Low	Low	Middle	High	Low	Low
Light Source	UHP	UHP Laser	UHP LED	UHP Laser	Laser	Laser
Mutuality	Mutual	Mutual	Mutual	Mutual	Developing	Developing
Maker	Hitach Panasonic	Sony Epson	TI	Sony Spatialight JVC	Sony Samsung	Microvision

~2005

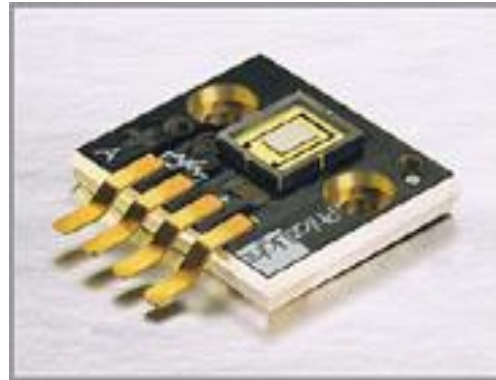
Arc Lamp



Philips
Osram
Panasonic

2005~2010

LED Lamp



Lumileds
Luminus
Osram

2007~

Laser



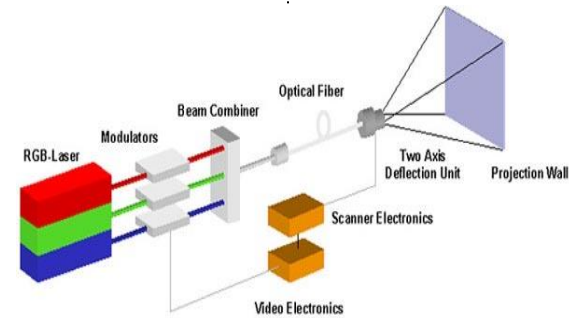
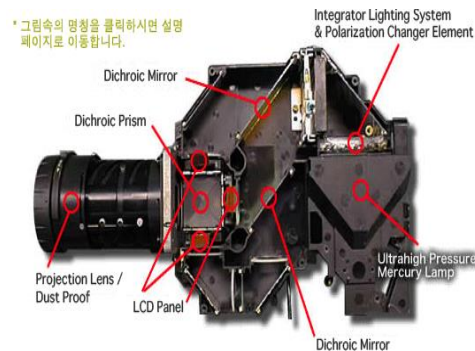
Sanyo
Nichiya
Novalux
Coherent

3. Technology Trend

3. Light Source Comparison

	UHP	LED	Laser
Size	Big	Small	Small
Efficiency	Good	Middle	Good
Price	Expensive	Middle	Low
Life Time	>2,000 hrs	<15,000hrs	<15,000hrs
Power Consumption	> 100W	> 30W	> 5W
Color Reality	Bad	Middle	Good
Maker	Philips Osram Ushio Panasonic	Lumileds Luminus Osram	Sanyo Nichiya Novalux

~2000	2001~2010	2005~2010	2007~
CRT Base	MD, UHP,LED	MD, Laser	Point Panel, Laser



	CRT Type	MD Type	1-D Type	Point Type
Size	Big	Middle~Small	Small	Quite Small
Material Price	Good	Middle	Low	Low
Mutuality	Mutual	Mutual	Under Develop	Under Develop
Company	Mostly China	Sony SS LGE		

Suitable combinations of display panel and light sources:

For Micro Projectors:

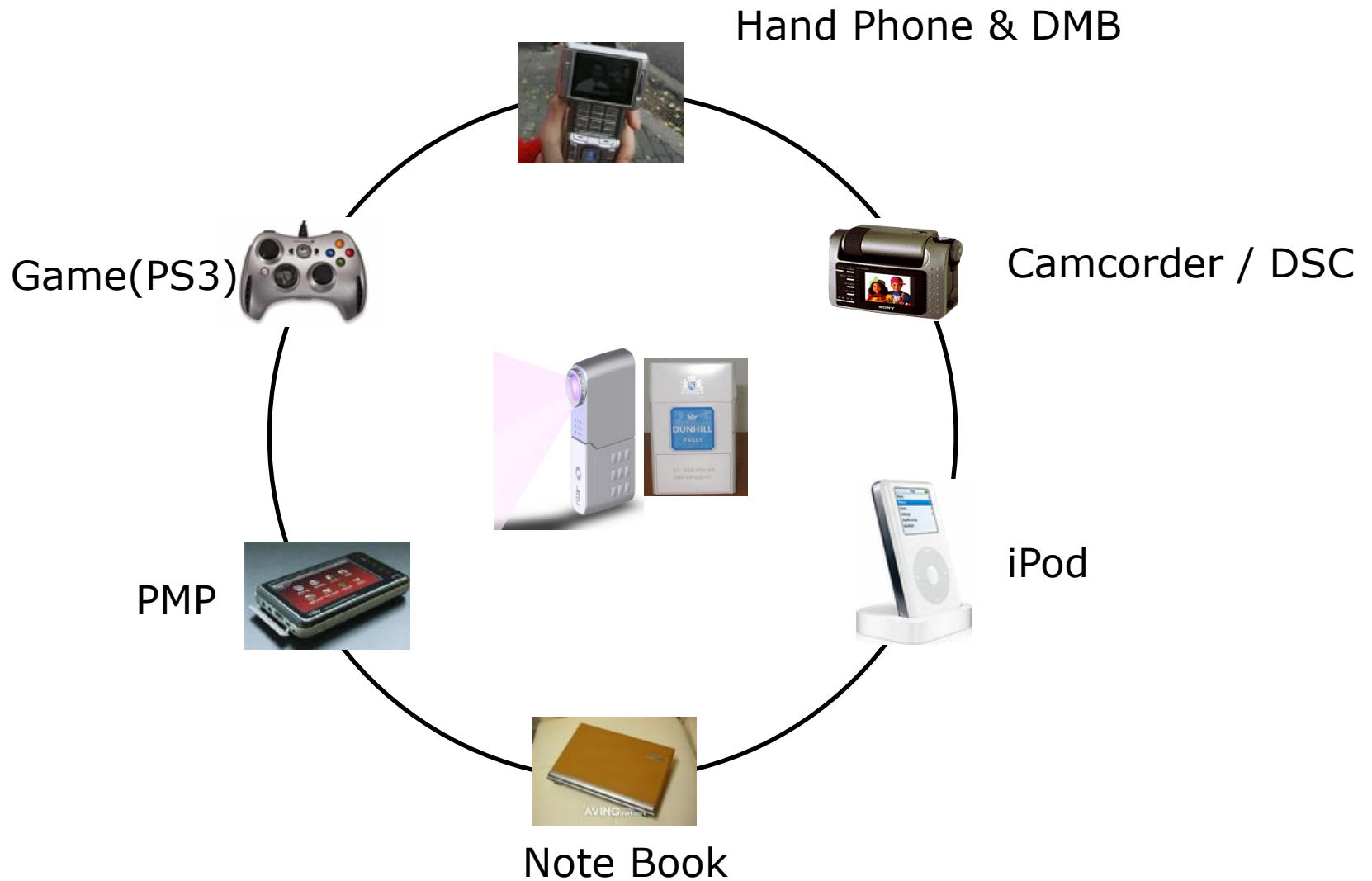
(1) Panel : LCoS Panel

(2) Light Source : Laser-based System

For Built-in Phone Projectors:



(1) Panel : 2 axis MEMS or Small Size LCoS

(2) Light Source : Laser-based System



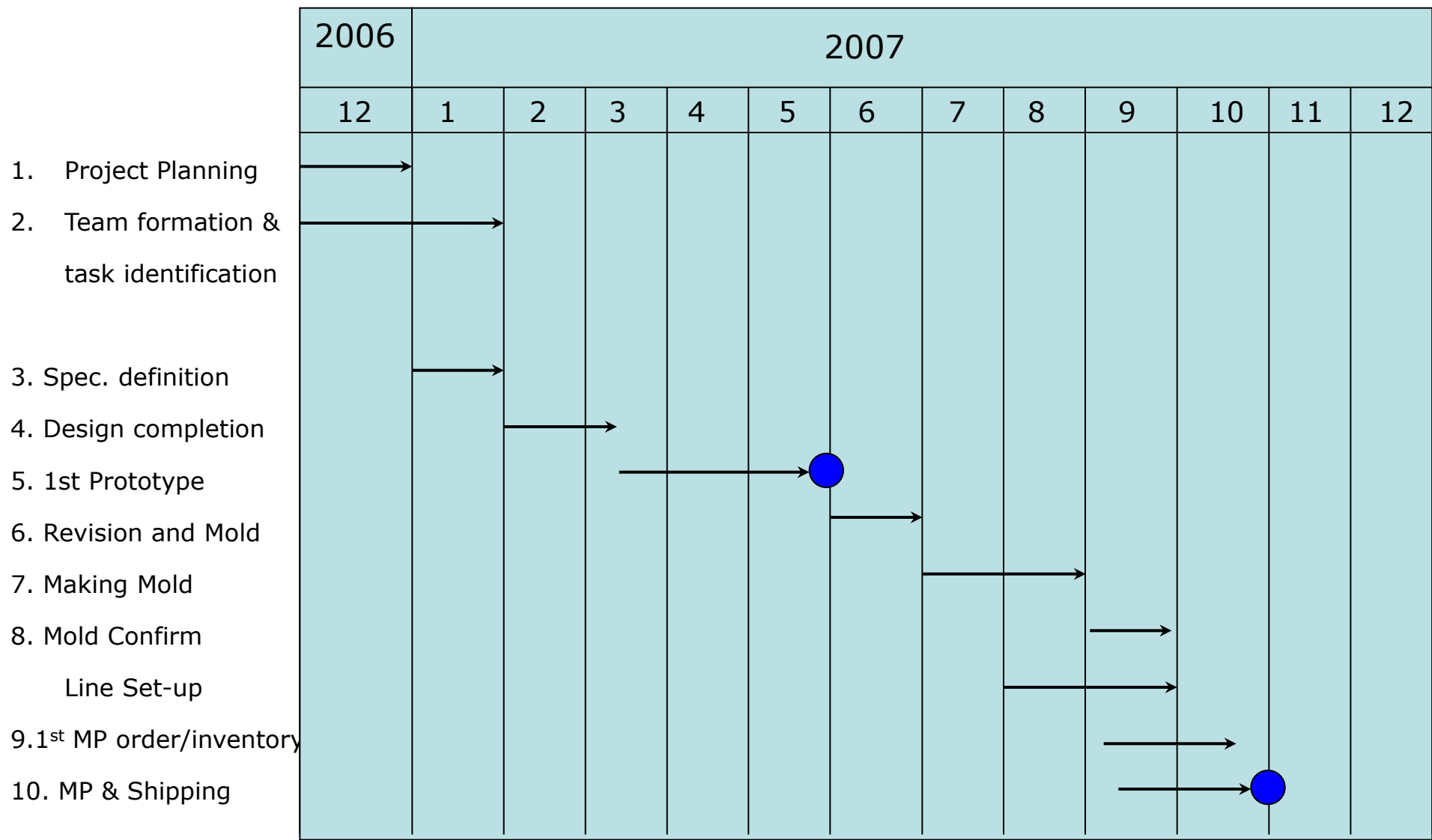
2007: propose to develop a cigarette case-sized Personal Projector

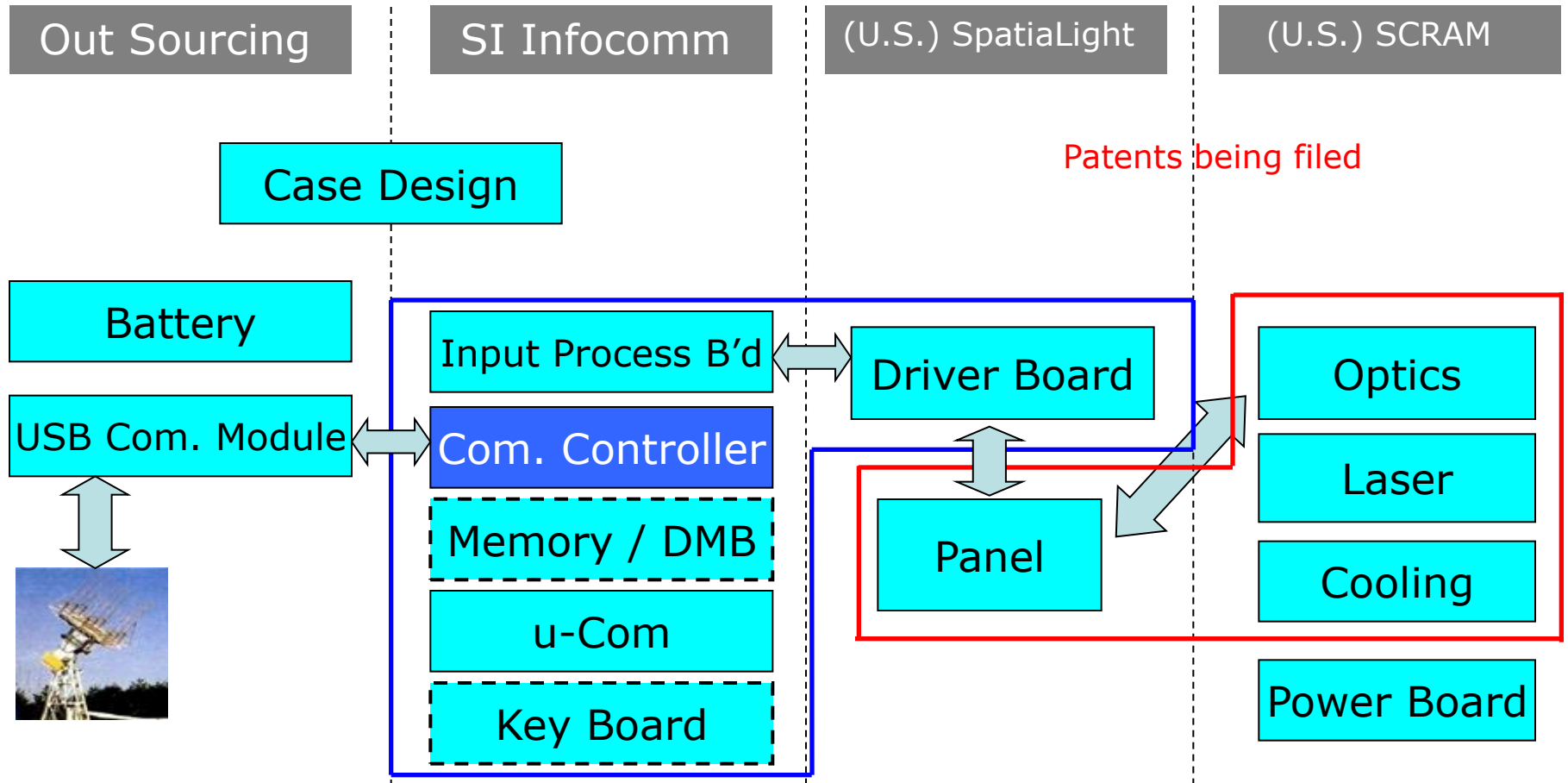
2008: propose to develop a Built-In Phone Projector

2007				2008			
1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
							

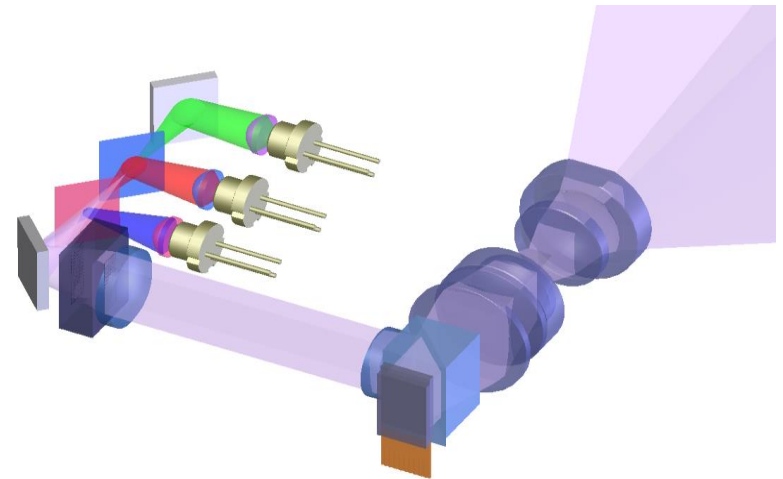
- Key Spec. :
- (1) size : cigarette case
 - (2) resolution : SVGA
 - (3) brightness : 20 lm
 - (4) price : Under \$200 U.S.

- Key Spec. :
- (1) size : Phone Built-In
 - (2) resolution : SVGA
 - (3) brightness : 10 lm
 - (4) price : Module Price \$30~50 U.S.





Brightness	> 20 lumen
Power Consumption	< 5 watt
Optic Engine Size	< 60 cc
Panel size	0.3" (4:3)
Resolution	SVGA
Uniformity	> 90 %
Light Source	LASER
Light Modulator	LCOS
Driving Scheme	FSC
Optical tolerance	Very good

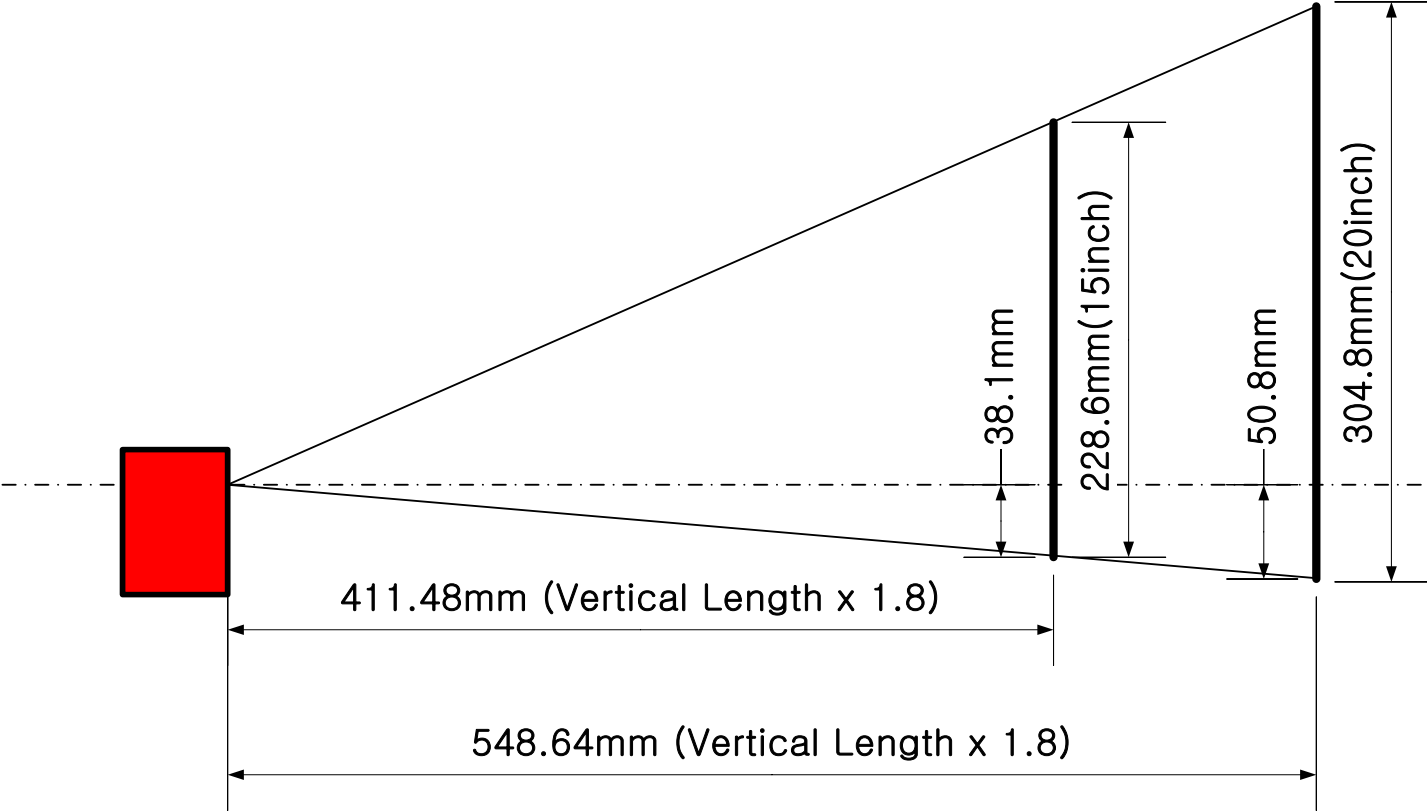


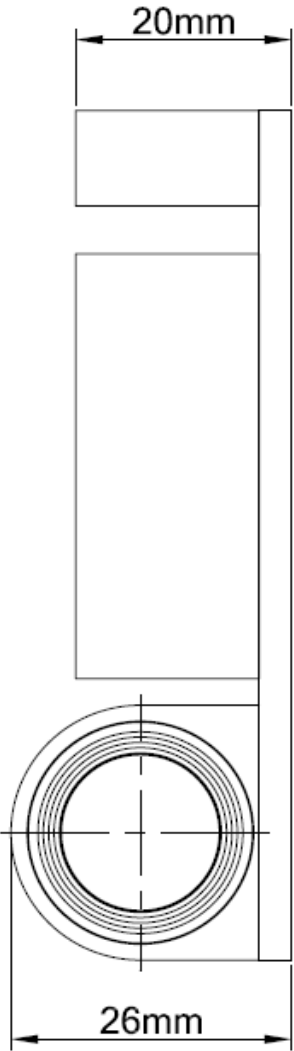
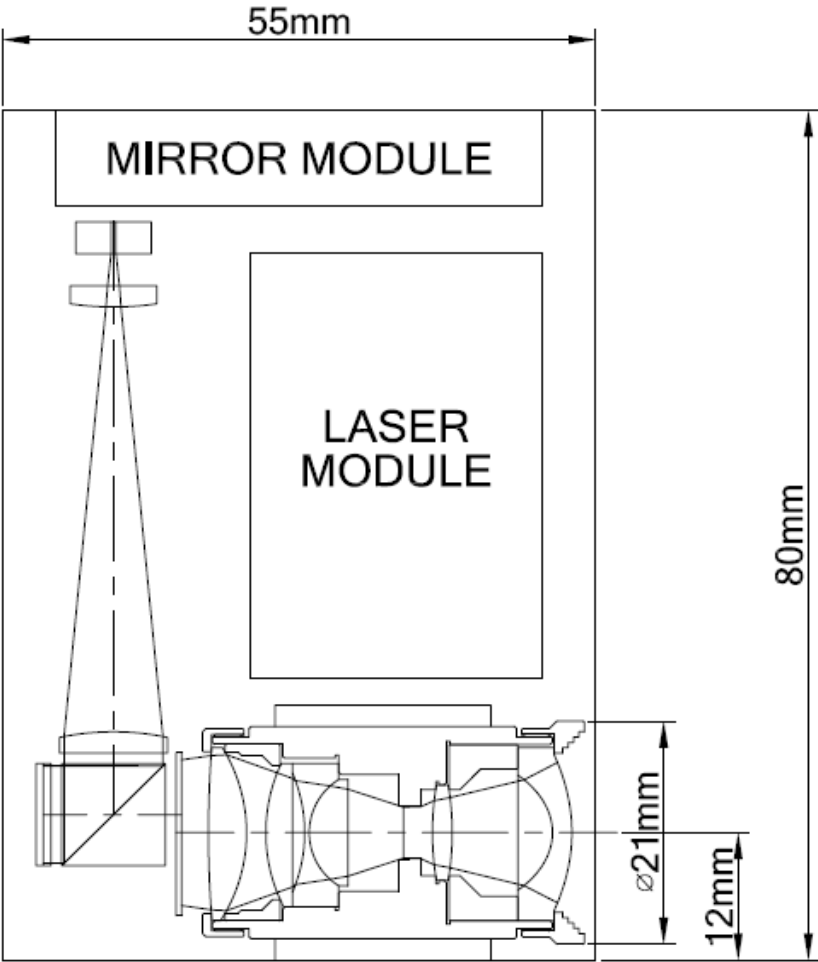
■ Laser Source

- Red 500mW : about 75lm -> nLaser
- Green 200mW : about 120lm -> Snake Creek
- Blue 500mW : about 10lm -> Nichia

■ Light Budget

- Total Source Lumen output : 205lm
- Single Panel time sequential driving : $205/3 = 68.3\text{lm}$
- Expected system out put Lumen : $68.3 \times 0.3 = 20.5\text{lm}$
(System efficiency 30%)





For Prototype development \$1M and for Mass Production preparation \$2M investments are needed.

Member	Task	Investment for Development	Investment for Mass Production	Profit Method
SI Infocomm	Development of drive electronics & component manufacturing and MP technology; Product marketing	\$200k	\$150k	Component production & assembly; sales of product
SpatiaLight	LCoS Panel development	\$500k	\$500k	Panel sales
SCRAM	Optical System Design & MP technology support	\$300k	\$ 350K	Royalty or sales of product

Labor Costs Excluded

Thank you!