

What Infineon Technologies is looking for in TERAFLAG

Jochen Koszescha, Director Fund. Prj. & Co-ord.
1st European TERAFLAG Workshop, 06.09.2018



Agenda

1

About Infineon

2

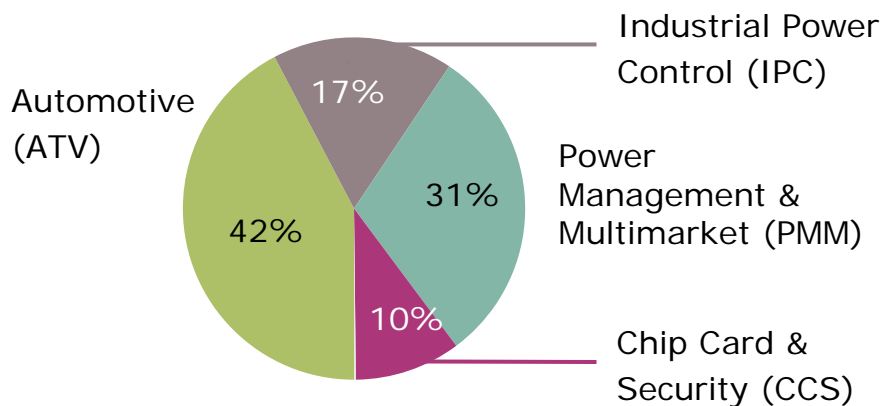
TERAFLAG Flagship proposal

3

Example Radar Sensor Market & Applications

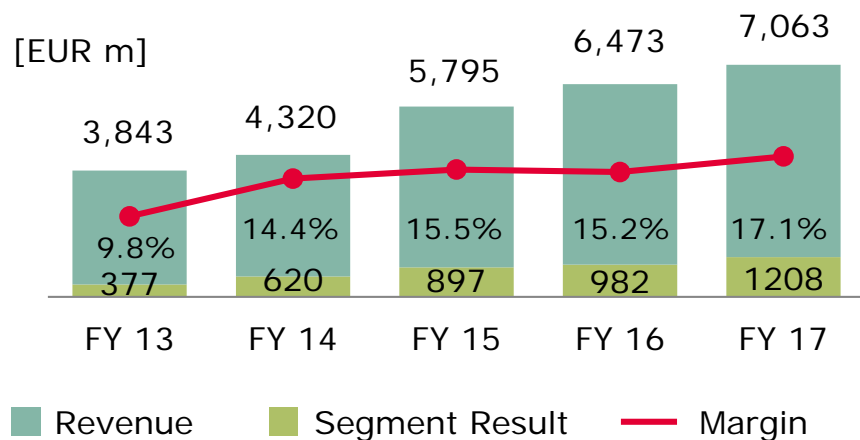
Infineon at a glance

Business Segments



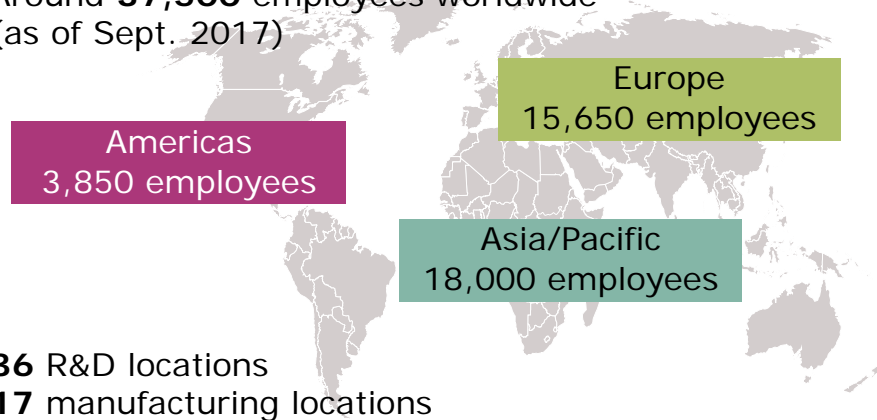
Revenue FY 2017

Financials



Employees

Around **37,500** employees worldwide (as of Sept. 2017)



Market Position

Automotive



2

Strategy Analytics,
April 2018

Power



1

IHS Markit*,
Technology Group,
August 2017

Smart card ICs



1

IHS Markit*,
Technology Group,
July 2017

Semiconductor Ranking

1H18 Top-25 Semiconductor Sales Leaders (\$M, Including Foundries)

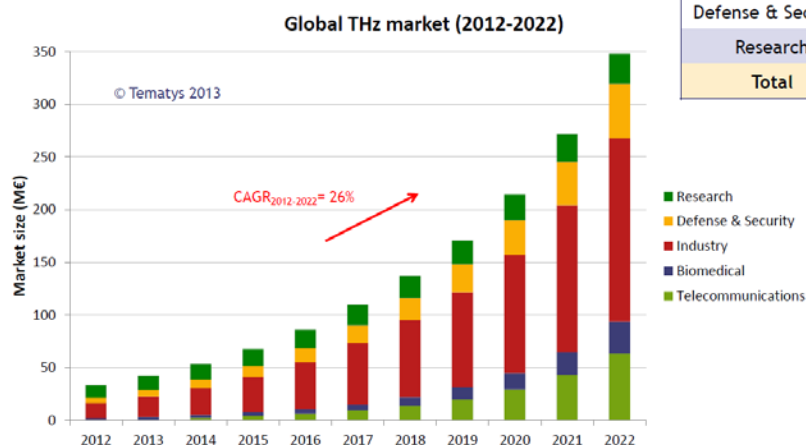
1H18 Rank	2017 Rank	Company	Headquarters	1Q18 Tot IC	1Q18 Tot O-S-D	1Q18 Tot Semi	2Q18 Tot IC	2Q18 Tot O-S-D	2Q18 Tot Semi	2Q18/1Q18 % Change	1H18 Tot Semi	1H17 Tot Semi	1H18/1H17 % Change
1	1	Samsung	South Korea	18,491	910	19,401	19,434	950	20,384	5%	39,785	29,181	36%
2	2	Intel	U.S.	15,832	0	15,832	16,753	0	16,753	6%	32,585	28,839	13%
3	4	SK Hynix	South Korea	8,016	125	8,141	9,421	192	9,613	18%	17,754	11,393	56%
4	3	TSMC (1)	Taiwan	8,473	0	8,473	7,839	0	7,839	-7%	16,312	14,601	12%
5	5	Micron	U.S.	7,486	0	7,486	7,920	0	7,920	6%	15,406	10,653	45%
6	6	Broadcom Ltd. (2)	U.S.	4,125	434	4,559	4,150	435	4,585	1%	9,144	8,404	9%
7	7	Qualcomm (2)	U.S.	3,897	0	3,897	4,087	0	4,087	5%	7,984	7,728	3%
8	9	Toshiba/Toshiba Memory	Japan	3,517	310	3,827	3,575	315	3,890	2%	7,717	6,159	25%
9	8	TI	U.S.	3,339	227	3,566	3,535	245	3,780	6%	7,346	6,595	11%
10	10	Nvidia (2)	U.S.	3,108	0	3,108	3,135	0	3,135	1%	6,243	4,083	53%
11	15	WD/SanDisk	U.S.	2,350	0	2,350	2,375	0	2,375	1%	4,725	3,715	27%
12	13	Infineon	Europe	1,360	907	2,267	1,388	926	2,314	2%	4,581	3,896	18%
13	11	NXP	Europe	2,017	252	2,269	2,035	255	2,290	1%	4,559	4,413	3%
14	12	ST	Europe	1,696	518	2,214	1,724	526	2,250	2%	4,464	3,732	20%
15	16	MediaTek (2)	Taiwan	1,696	0	1,696	2,032	0	2,032	20%	3,728	3,726	0%
16	17	Apple* (2)	U.S.	1,830	0	1,830	1,700	0	1,700	-7%	3,530	3,110	14%
17	18	Renesas (3)	Japan	1,310	370	1,680	1,423	402	1,825	9%	3,505	3,266	7%
18	23	AMD (2)	U.S.	1,647	0	1,647	1,756	0	1,756	7%	3,403	2,011	69%
19	14	Sony	Japan	200	1,335	1,535	222	1,632	1,854	21%	3,389	3,608	-6%
20	19	GlobalFoundries (1)	U.S.	1,540	0	1,540	1,570	0	1,570	2%	3,110	2,833	10%
21	20	Analog Devices (3)	U.S.	1,405	110	1,515	1,405	110	1,515	0%	3,030	2,722	11%
22	21	Microchip (3)	U.S.	1,252	216	1,468	1,325	215	1,540	5%	3,008	2,728	10%
23	22	ON Semi	U.S.	661	717	1,378	707	749	1,456	6%	2,834	2,775	2%
24	24	UMC (1)	Taiwan	1,278	0	1,278	1,306	0	1,306	2%	2,584	2,440	6%
25	25	HiSilicon (2)	China	1,090	0	1,090	1,155	0	1,155	6%	2,245	2,100	7%
Top-10 Total				76,284	2,006	78,290	79,849	2,137	81,986	4.7%	160,276	127,636	26%
Top-25 Total				97,616	6,431	104,047	101,972	6,952	108,924	4.7%	212,971	174,711	22%

(1) Foundry (2) Fabless (3) Includes acquired company's sales for all of 2017 and 2018.

Source: Company reports, IC Insights' Strategic Reviews database

*Custom devices for internal use.

THz market growth



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	CAGR 2012-2022
Telecommunications	0	0	0	0	6	9	14	20	29	43	63	46%*
Biomedical	2	2.5	3	4	5	6	8	11	15	21	30	32%
Industry	15	19	25	33	44	58	73	90	112	140	174	28%
Defense & Security	5	7	8	11	13	17	21	26	33	41	52	26%
Research	12	13	15	16	18	19	21	23	24	26	28	9%
Total	34	42	53	68	86	110	137	171	214	272	348	26%

- ➔ The THz market should reach almost 350 M€ by 2022 with a CAGR of 26%.
- ➔ Non destructive testing for industrial applications is expected to be the biggest market for the next 10 years.
- ➔ The highest growth is expected for telecommunication applications.

Agenda

1

About Infineon

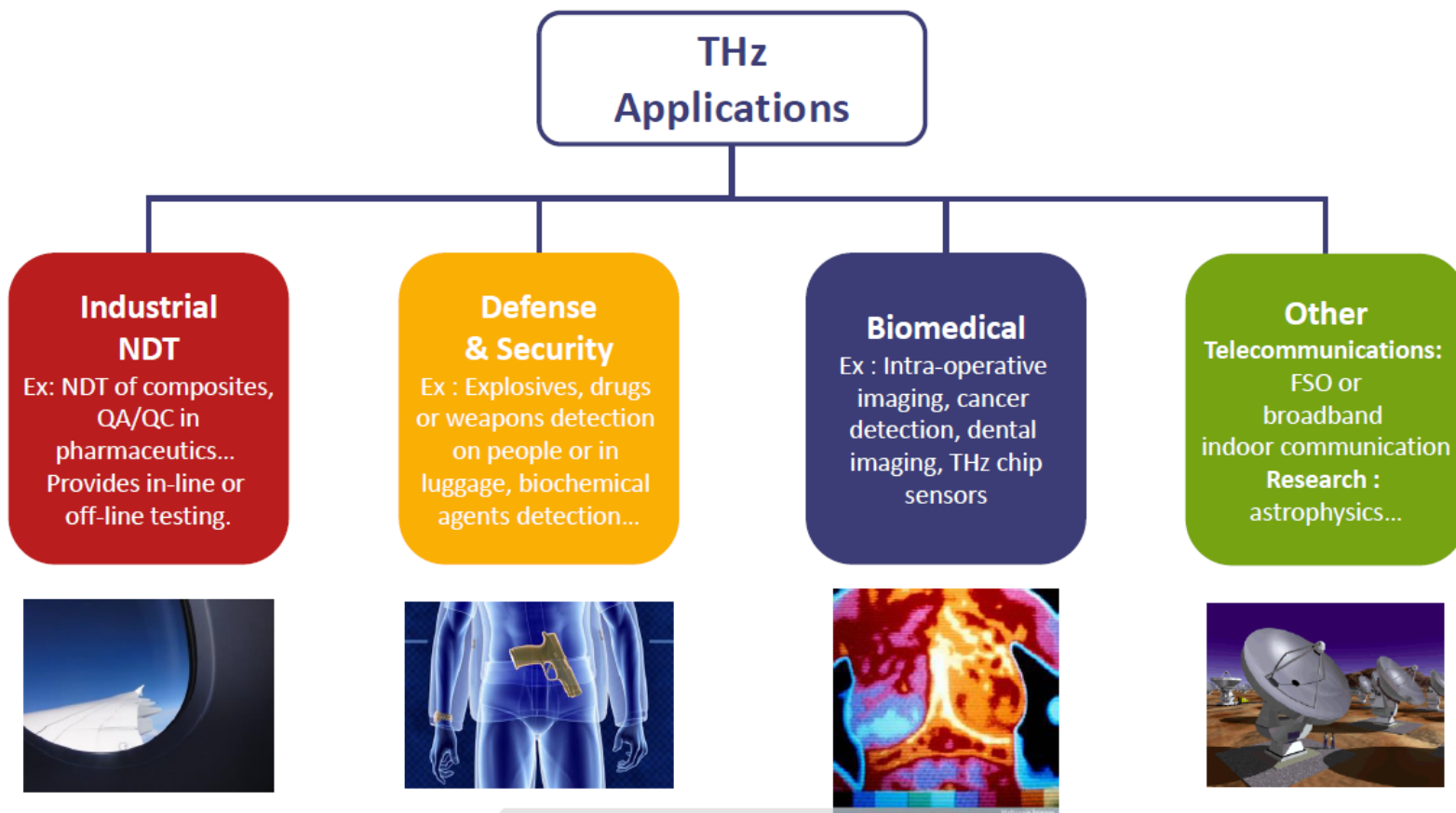
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TERAFLAG Flagship proposal

3

Example Radar Sensor Market & Applications

THz Applications



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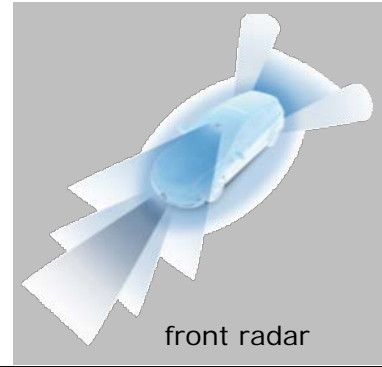
TERAFLAG Flagship proposal

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Example Radar Sensor Market & Applications

From speed and distance measurement to HMI, Space & Motion and Biometrics

What radar is currently used and known for



What radar can be used for in the future

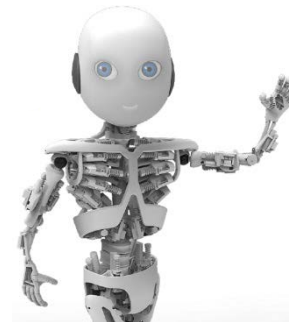
Human Machine Interface



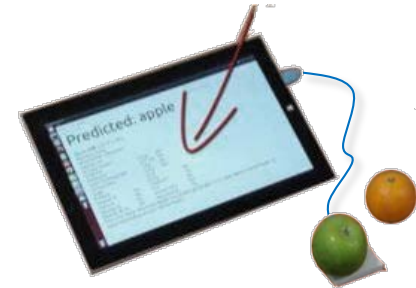
Autonomous flying



Improved Occupancy Sensing & Object detection



Robotics *robby.org*
(e.g. collaborative robots)



Material Detection

Space & Motion sensing



Autonomous driving



Gesture control



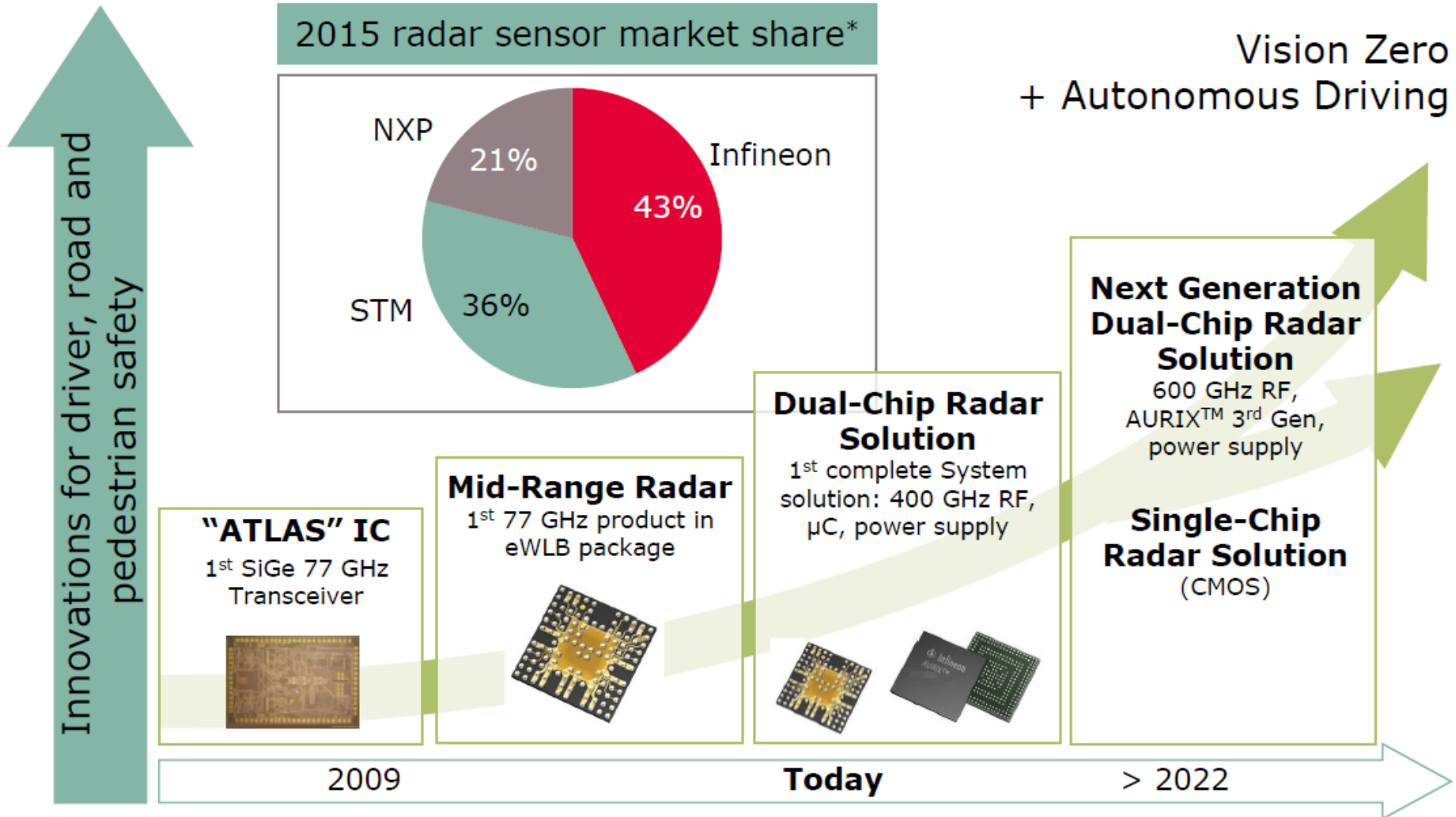
Vital Sensing



Security

Biometrics

Infineon is the market leader in Radar, > 15 million chips shipped already



* Source: IHS Inc., "Advanced Driver Assistance Applications Sensor Market Database – H2 2015", February 2016

TERAFLAG Flagship proposal

Goal:

Increasing the performance of High frequency circuits

Increase of the frequency for Application of
120 GHz towards ≥ 300 (600) GHz

Main Applications:

- Future Connectivity(high speed wireless communications)
- Radar and Sensing for Mobility
- Robotics
- Material recognition for and damage detection for industrial
- Health (e.g. breast cancer detection or blood sugar analysis



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