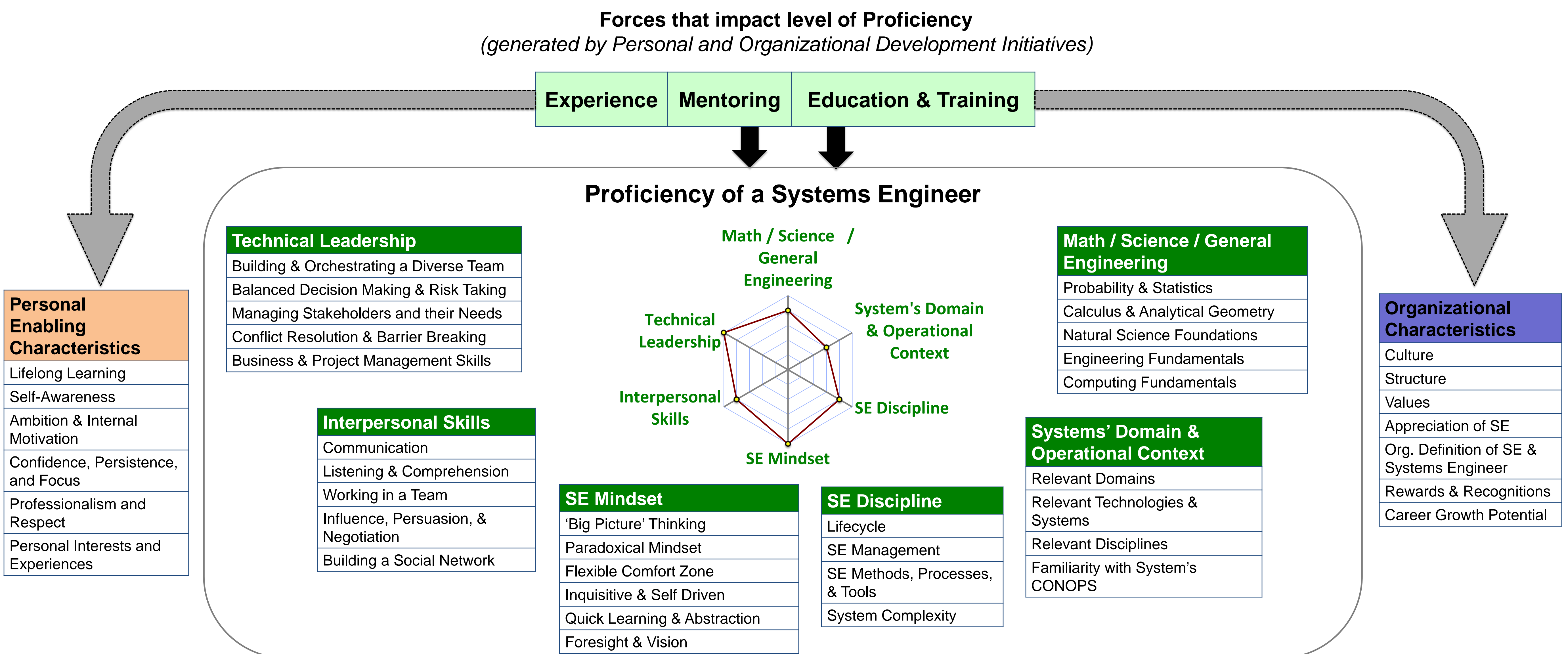


- Helix is a multi-year longitudinal study designed to build an understanding of the systems engineering workforce in the U.S. Department of Defense (DoD) and the Defense Industrial Base (DIB)
- Helix is focusing on three main research questions: **1.** What are the characteristics of systems engineers? **2.** How effective are systems engineers and why? **3.** What are employers doing to improve the effectiveness of their systems engineers?
- Data collection is primarily through face-to-face, semi-structured interviews with systems engineers
- Reporting is done in an aggregated anonymous manner without revealing the identities of participating individuals or organizations

## Atlas: The Theory of Effective Systems Engineers, v. 0.25



## Analysis of INCOSE Professional Certification Program Applications

Countries and Degrees	Variants of Associate and Bachelor	Variants of Master and Doctorate	Most Popular Majors																																																																																																																																																																																																																																																																																																																																																																					
<p>Country from Which Applicant Applied</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rank</th> <th>Country</th> <th># Applicants</th> <th>% Total</th> </tr> </thead> <tbody> <tr><td>1</td><td>US</td><td>1847</td><td>74%</td></tr> <tr><td>2</td><td>India</td><td>179</td><td>7%</td></tr> <tr><td>3</td><td>Germany</td><td>151</td><td>6%</td></tr> <tr><td>4</td><td>France</td><td>101</td><td>4%</td></tr> <tr><td>5</td><td>UK</td><td>49</td><td>2%</td></tr> <tr><td>6</td><td>Sweden</td><td>41</td><td>&lt;2%</td></tr> <tr><td>7</td><td>Spain</td><td>36</td><td>1%</td></tr> <tr><td></td><td>Other</td><td>100</td><td>4%</td></tr> </tbody> </table> <p>Highest Degrees Awarded</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Degree</th> <th># Awarded</th> <th>% Total</th> </tr> </thead> <tbody> <tr><td>Doctorate</td><td>193</td><td>8%</td></tr> <tr><td>Masters</td><td>1533</td><td>61%</td></tr> <tr><td>Bachelors</td><td>746</td><td>30%</td></tr> <tr><td>Associate</td><td>10</td><td>&lt;1%</td></tr> <tr><td>Other</td><td>22</td><td>&lt;1%</td></tr> <tr><td>Total</td><td>2504</td><td>100%</td></tr> </tbody> </table>	Rank	Country	# Applicants	% Total	1	US	1847	74%	2	India	179	7%	3	Germany	151	6%	4	France	101	4%	5	UK	49	2%	6	Sweden	41	<2%	7	Spain	36	1%		Other	100	4%	Degree	# Awarded	% Total	Doctorate	193	8%	Masters	1533	61%	Bachelors	746	30%	Associate	10	<1%	Other	22	<1%	Total	2504	100%	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ASSOCIATE Degree</th> <th colspan="2">BACHELORS Degree</th> </tr> <tr> <th>COUNT</th> <th>%</th> <th>#</th> <th>%</th> </tr> </thead> <tbody> <tr><td>Associate of Science</td><td>40</td><td>Bachelor of Science</td><td>1813 77%</td></tr> <tr><td>Associate of Applied Science</td><td>32</td><td>Bachelor of Engineering</td><td>316 13%</td></tr> <tr><td>Associate of Arts</td><td>20</td><td>Bachelor of Arts</td><td>203 9%</td></tr> <tr><td>Associate</td><td>15</td><td>Bachelor</td><td>8 &lt;1%</td></tr> <tr><td>Diploma</td><td>5</td><td>Bachelor of Technology</td><td>5 &lt;1%</td></tr> <tr><td>Vordiplom</td><td>3</td><td>Baccalaureate</td><td>3 &lt;1%</td></tr> <tr><td>Associate of Science - Equivalent</td><td>2</td><td>Post Graduate Diploma</td><td>3 &lt;1%</td></tr> <tr><td>Associate of Engineering Technology</td><td>1</td><td>Bachelor of Civil Engineering Technology</td><td>1 &lt;1%</td></tr> <tr><td>Institute associationship in engineering</td><td>1</td><td>Bachelor of Business Administration</td><td>1 &lt;1%</td></tr> <tr><td></td><td>119</td><td>Bachelor of Arts/Bachelor of Science</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>Bachelor of Law</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>Bachelor of Science in Business Administration</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>Bachelor in General Studies</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>Bachelor of Commerce</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>Bachelor of Professional Studies</td><td>1 &lt;1%</td></tr> <tr><td></td><td></td><td>TOTAL</td><td>2359</td></tr> </tbody> </table> <p style="text-align: center; background-color: yellow;">Most of those with Associate degrees have gone on to obtain higher degrees</p> <p style="text-align: center; background-color: yellow;">Bachelor of Science dominates</p>	ASSOCIATE Degree		BACHELORS Degree		COUNT	%	#	%	Associate of Science	40	Bachelor of Science	1813 77%	Associate of Applied Science	32	Bachelor of Engineering	316 13%	Associate of Arts	20	Bachelor of Arts	203 9%	Associate	15	Bachelor	8 <1%	Diploma	5	Bachelor of Technology	5 <1%	Vordiplom	3	Baccalaureate	3 <1%	Associate of Science - Equivalent	2	Post Graduate Diploma	3 <1%	Associate of Engineering Technology	1	Bachelor of Civil Engineering Technology	1 <1%	Institute associationship in engineering	1	Bachelor of Business Administration	1 <1%		119	Bachelor of Arts/Bachelor of Science	1 <1%			Bachelor of Law	1 <1%			Bachelor of Science in Business Administration	1 <1%			Bachelor in General Studies	1 <1%			Bachelor of Commerce	1 <1%			Bachelor of Professional Studies	1 <1%			TOTAL	2359	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">MASTERS Degree</th> <th colspan="2">DOCTORATE Degree</th> </tr> <tr> <th>#</th> <th>%</th> <th>#</th> <th>%</th> </tr> </thead> <tbody> <tr><td>Master of Science</td><td>1442 69%</td><td>Doctor of Philosophy</td><td>189 95%</td></tr> <tr><td>Master of Engineering</td><td>337 16%</td><td>Juris Doctor</td><td>6 3%</td></tr> <tr><td>Master of Business Administration</td><td>196 9%</td><td>Doctor of Science</td><td>2 1%</td></tr> <tr><td>Master of Arts</td><td>70 3%</td><td>Promotion Doctor of Philosophy-Ing.</td><td>1 &lt;1%</td></tr> <tr><td>Master</td><td>24 1%</td><td>Doctor of Engineering</td><td>1 &lt;1%</td></tr> <tr><td>DEA</td><td>5 &lt;1%</td><td>Doctor of Management</td><td>1 &lt;1%</td></tr> <tr><td>Diplom</td><td>3 &lt;1%</td><td>TOTAL</td><td>200</td></tr> <tr><td>Diplom-Informatiker</td><td>3 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Public Administration</td><td>3 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Technology</td><td>2 &lt;1%</td><td></td><td></td></tr> <tr><td>Master in Management</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Business</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Engineering Management</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Engineering sciences</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Library Science</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Public Policy</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Science (Software Systems)</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Master of Science/Master of Business Administration</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Specialised Master</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>Diplom-Physiker</td><td>1 &lt;1%</td><td></td><td></td></tr> <tr><td>TOTAL</td><td>2095</td><td></td><td></td></tr> </tbody> </table> <p style="text-align: center; background-color: yellow;">Doctor of Philosophy heavily dominates</p> <p style="text-align: center; background-color: yellow;">Master of Science dominates</p>	MASTERS Degree		DOCTORATE Degree		#	%	#	%	Master of Science	1442 69%	Doctor of Philosophy	189 95%	Master of Engineering	337 16%	Juris Doctor	6 3%	Master of Business Administration	196 9%	Doctor of Science	2 1%	Master of Arts	70 3%	Promotion Doctor of Philosophy-Ing.	1 <1%	Master	24 1%	Doctor of Engineering	1 <1%	DEA	5 <1%	Doctor of Management	1 <1%	Diplom	3 <1%	TOTAL	200	Diplom-Informatiker	3 <1%			Master of Public Administration	3 <1%			Master of Technology	2 <1%			Master in Management	1 <1%			Master of Business	1 <1%			Master of Engineering Management	1 <1%			Master of Engineering sciences	1 <1%			Master of Library Science	1 <1%			Master of Public Policy	1 <1%			Master of Science (Software Systems)	1 <1%			Master of Science/Master of Business Administration	1 <1%			Specialised Master	1 <1%			Diplom-Physiker	1 <1%			TOTAL	2095			<table border="1" style="width: 100%; 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Electrical Engineering	468	Electrical Engineering	77	168	112	106	5																																																																																																																																																																																																																																																																																																																																																																	
Mechanical Engineering	205	Mechanical Engineering	17	62	56	63	7																																																																																																																																																																																																																																																																																																																																																																	
Computer Science	150	Computer Science	7	47	38	53	5																																																																																																																																																																																																																																																																																																																																																																	
Aerospace Engineering	98	Aerospace Engineering	8	32	25	32	1																																																																																																																																																																																																																																																																																																																																																																	
Physics	87	Physics	23	30	25	9	0																																																																																																																																																																																																																																																																																																																																																																	
Mathematics	77	Mathematics	27	26	9	15	0																																																																																																																																																																																																																																																																																																																																																																	
Computer Engineering	52	Computer Engineering	2	6	9	33	2																																																																																																																																																																																																																																																																																																																																																																	
Popular Masters Majors		Trend in Popular Masters Majors																																																																																																																																																																																																																																																																																																																																																																						
Major	#	Major	Before 1980	1980-89	1990-99	2000-09	2010-13																																																																																																																																																																																																																																																																																																																																																																	
Systems Engineering	238	Systems Engineering	5	5	17	124	87																																																																																																																																																																																																																																																																																																																																																																	
Electrical Engineering	225	Electrical Engineering	22	61	75	61	6																																																																																																																																																																																																																																																																																																																																																																	
Computer Science	118	Computer Science	7	31	33	39	8																																																																																																																																																																																																																																																																																																																																																																	
Mechanical Engineering	81	Mechanical Engineering	5	16	31	26	3																																																																																																																																																																																																																																																																																																																																																																	
Business Administration	62	Business Administration	4	5	22	21	10																																																																																																																																																																																																																																																																																																																																																																	
Engineering Management	58	Engineering Management	0	5	22	22	9																																																																																																																																																																																																																																																																																																																																																																	

## Research Plans for 2015

- Develop next version of the theory of effective systems engineers, *Atlas* v. 0.5
- Expand data collection beyond defense-related organizations, and to include program / project managers and other specialty engineers
- Validate and implement model for developing effective systems engineers
- Continue analysis of INCOSE Professional Certification Program applications

## Contact

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