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ANALYSIS:
NATO - BETWEEN
WASHINGTON AND BRUSSELS

THE PAC15 PREMIERE
AR-15 FROM RADOM

BERYL M762 FOR NIGERIA

LONGSHOT 2018
LONG RANGE SHOOTING

TEST:
HOLOSUN HS403GL RED DOT
MACTRONIC PATROL CHARGER+



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Analysis:

NATO – Between

Washington and Brussels



NATO Headquarters published a document summarizing the expenses for defense of their member countries for the 2011-2018 period. The document was created based on the reports generated by ministers of defense of the NATO countries and includes spendings up to the end of 2018. The publicized data are to illustrate the good transatlantic relationships against the current changes in the global security policies.



When tracing the fluctuations of NATO spending in the last two decades, a couple of interesting trends can be observed. The first trend is not exceeding the recommended in 1999 2% of GDP spending. Interestingly, this concerns only the average spending of European members and Canada, without the USA – a traditional steam engine of NATO development. One of the factors for lower spendings could be the acceptance of new members into NATO. Poland, Hungary and Czech Republic economies faced economic problems at the time.

This trend is also visible in the newest report. For 2011-2018 spending on defense, Poland is in the lead with 1,72% to 2,22% GDP being spent on defense. Czech Republic spent between 0,96% and 1,11% GDP in the same period while Hungary's expenses totalled up to 0,86% - 1,05% GDP. NATO expansion, however, should not be looked

upon as the only factor affecting the European spending on defense. The downturn was visible through the whole of 90`s with a noticeable change after the September 11th, 2001 attacks. Destruction of World Trade Center resulted in increased expenditures mostly in the USA but affected the statistic of the whole NATO. Europe's defense outgoings were on the downturn until 2007.

The ISAF mission

The biggest factor affecting the defense outgoings in the last decade was the Afghanistan conflict. Operations in Central Asia were affected by the International Security Assistance Force (ISAF) created as a part of the NATO structure. Between 2001 and 2014 there were 130.000 from 51 countries taking part in this operations. Years 2007 - 2009 are especially worth a careful look. At this time

The biggest challenge facing the NATO Secretary General, Jens Stoltenberg, is maintaining good transatlantic relations within the Alliance





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an unprecedented increase in spending was noted. In those 2 years, alone USA enlarged their armed force's budget from 4% to 5,29% of GDP. This approached the cold war era spendings. As Americans are the biggest contributor to NATO, this seriously affected the overall figures. Globally, NATO increased their outgoings to 3,28% GDP - the highest number since the 1990's. The graph illustrating the expenditures of Canada and European members is also very interesting. Despite failing to reach the recommended goal of 2% GDP, first time for 20 years there was a small increase in overall GDP percentage of the NATO defense budget. This, of course, is a direct result of Afghanistan happenings. ISAF started their control-gaining activities in the south-east part of the country in 2006. The joined operations were opposed by local

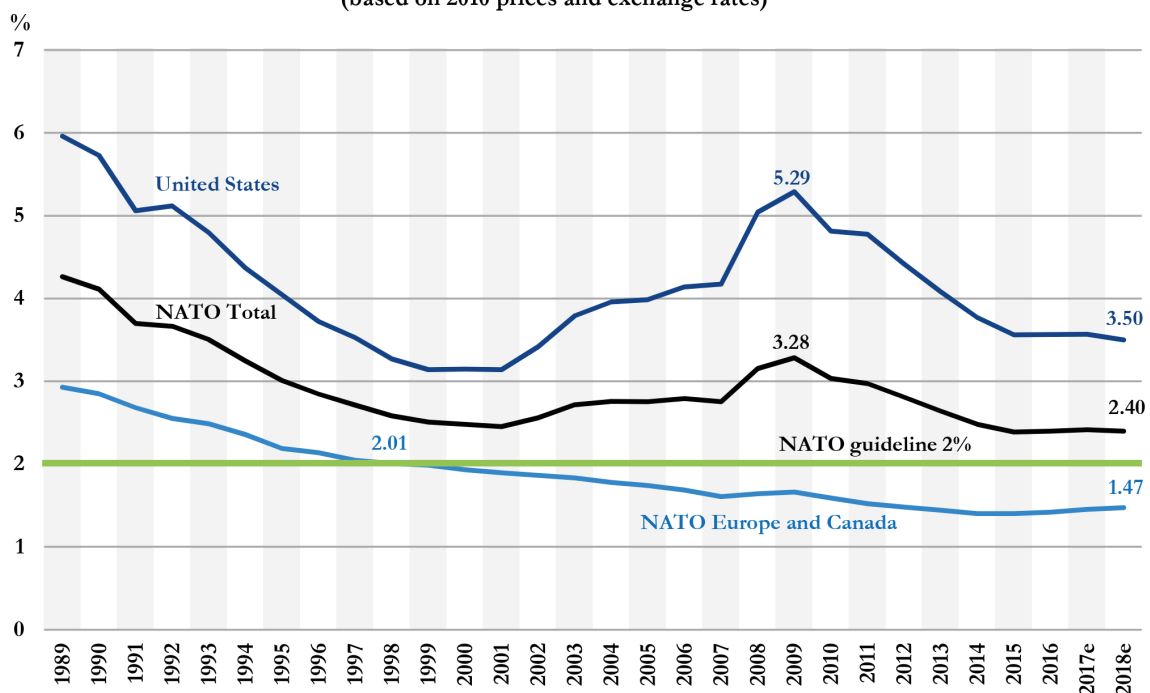
guerrilla groups supported by the Taliban. The resulted in hard fightings which tied up the coalition forces between 2007 and 2008 and increased the operation's cost. Additional 40.000 soldiers were sent to Afghanistan in 2009 and the NATO budget was affected again.

Global crisis

Another factor is the 2007 global financial crisis which started in the USA and impacted most of the important world economies. This resulted in a throttled development and GDP destined for the defense was lowered. The economy was one of the factors affecting the intensity of NATO involvement in Afghanistan. Presented data clearly shows the drop in GDP percentage for both USA and other members. In 2015 it reached 3,56% in the

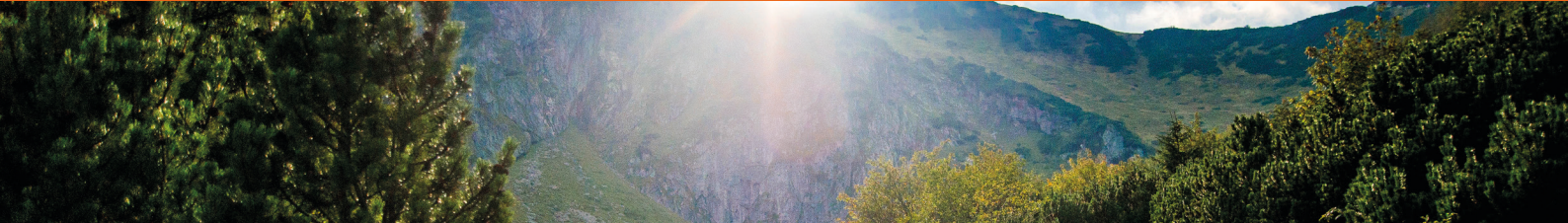
NATO, USA and other member's expenditures on defense summed up as a GDP percentage. The green line indicated the recommended 2% GDP threshold

Defence expenditure as a share of GDP (%)
(based on 2010 prices and exchange rates)





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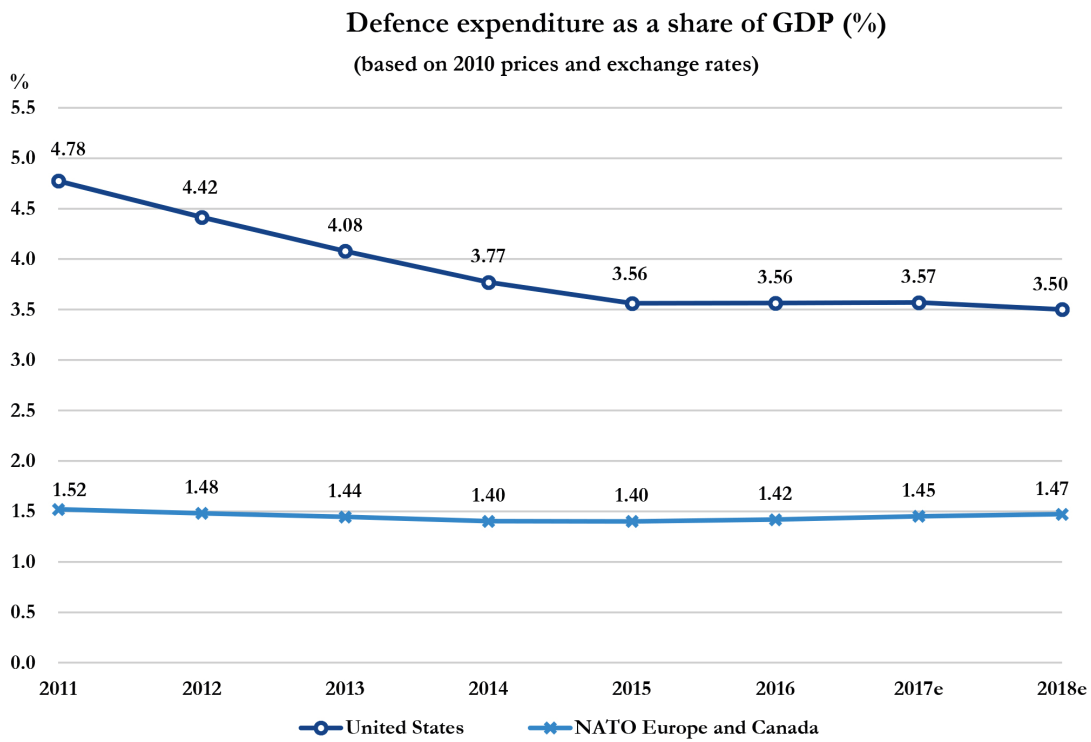
United States and 1,40% average in Europe and Canada. This brings up another turning point for NATO. This time, however, Europe and the Middle East became the focus of attention.

Russia and the Middle East

In the previous decade, Russian Federation consistently rebuilt and modernized their

armed forces. Starting with the Georgian conflict during the 2008 South Ossetia War, Russian planners were modifying the Russian armed forces doctrine. This resulted in 2014 incorporation of Crimea and financing of separatistic movements of Donbas. Simultaneously in 2013-2014 Middle East experiences the intensification of terrorist activities with Daesh creation in Iraq and Syria at its peak. The result is the biggest migration crisis in the 21st century.

Comparison of NATO expenditures between the USA and other member countries (totalled up) in the years 2011-2018



Notes: Figures for 2017 and 2018 are estimates. The NATO Europe and Canada aggregate from 2017 includes Montenegro, which became an Ally on 5 June 2017.

2014 Wales summit

NATO planners had to consider two critical threats to organization's strategies: the Russian - Ukraine conflict in Donbas and the issue of providing for hundreds of thousands of migrants and refugees arriving from the

Middle East. Global security policies were illustrated by 2014 Newport NATO summit when a Readiness Action Plan was accepted with a goal of increasing the defense capabilities of NATO's territories. As an aftermath of the Newport summit, most of the European countries increased



The US as the most important force in NATO will continue to exert the greatest influence on the formation of the Alliance's doctrine

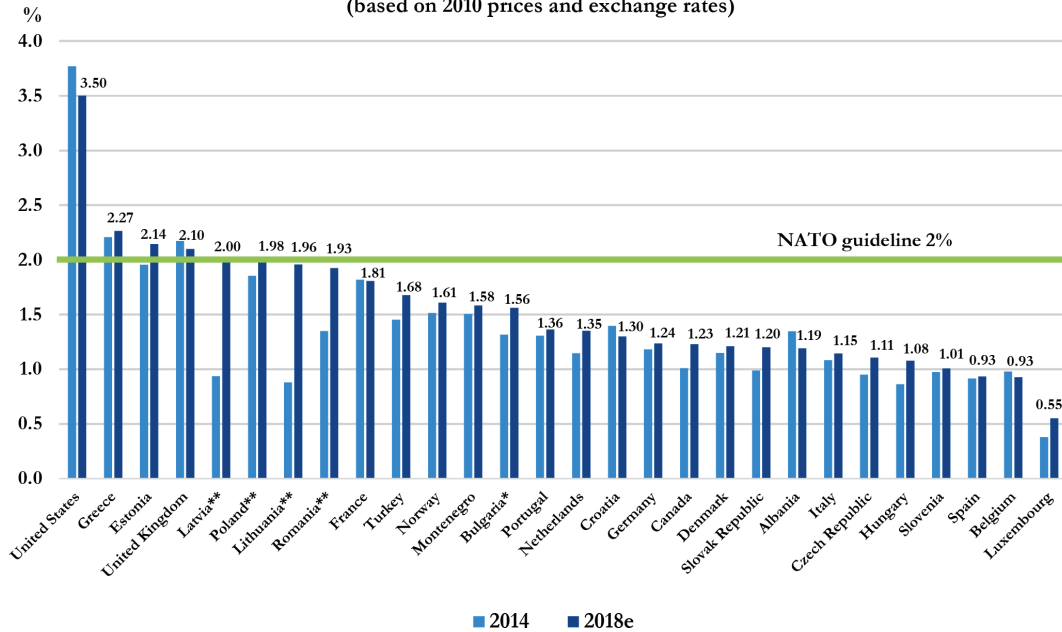
their spendings. According to the NATO HQ analysis, the only countries reaching the 2% threshold in 2018 were the USA (3,5%), Greece (2,27%), Estonia (2,14%), Great Britain (2,1%) and Latvia (2,0%). Poland (1,98%), Romania (1,93%) and France (1,81%) are nearing the recommended value.

Redefinition of challenges

Redefinition of the biggest NATO challenges resulted in modernizing processes started by European armies. The twenty-first-century doctrine of light expedition forces gave in when confronted with changing realities.

Defence expenditure as a share of GDP (%)

(based on 2010 prices and exchange rates)



Notes: Figures for 2018 are estimates.

* Defence expenditure does not include pensions.

** With regard to 2018, these countries have either national laws or political agreements which call for at least 2% of GDP to be spent on defence annually, consequently these estimates are expected to change accordingly.

Defense expenditures of NATO countries shown as a percentage of global GDP. The green line indicates the 2% recommended threshold. Comparison of 2014 data with predicted 2018 outgoings.

Afghanistan already showed that the need for artillery/heavy vehicle support has to be considered. The need for armor when combating Iraq's and Syria's insurgents was obvious. At the same time, the armored forces had to modernize and adapted to the changing combat field conditions. The threats of Russian-Ukrainian conflict escalation left a visible mark in the decision-making. All those factors caused a jump in expenditures on new equipment and modernization. Compared to 2014 the increase happened in each country but the UK and France. The 20% of the overall defense budget was to be spent on modernization according to the NATO planners. This value was reached by 15 out of 28 member states (including Poland with 23,95%) US domination

When analyzing the defense budgets of NATO members in this period USA's dominant position can't be overlooked. Over 70% if the NATO financial efforts come from the United States. It is expected that in 2018 alone USA will provide 706 billion USD compared to 286 billion from European countries. Poland's budget is estimated at just over 12 billion USD (42 billion PLN). A very pronounced disparity is visible between the North Americans (including Canada) and the Old Continent. Since the beginnings of NATO, USA was the main - if not dominant - member. Initially as a guarantor of West's safety, then as an anti-terror coalition leader. But when analyzing recent communications from USA administration it looks like the USA is considering the redefinition of their role as a leader.

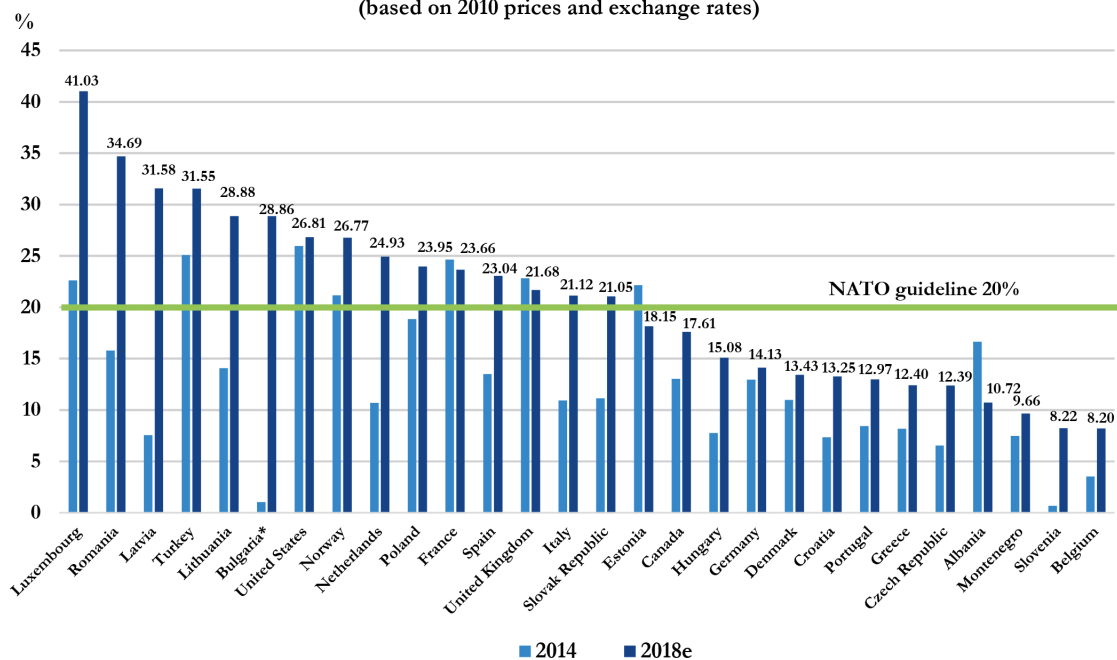
US versus China

It seems that Donald Trump aims for a general change of armed forces subordinate to him. Despite the tensions with the Russian Federation, America seems to be more tro-

ubled by the increasing position of China. The People Republic of China is currently the second most powerful (after USA) economy in the world. China also consistently builds their military potential. The most worrying for the intelligence analyst might be the

Equipment expenditure as a share of defence expenditure (%)

(based on 2010 prices and exchange rates)



Notes: Figures for 2018 are estimates.
* Defence expenditure does not include pensions.

Spending for modernization and new equipment as a percent of the overall defense budget. 2014 and 2018 budgets comparison with 20% indicated by the green line.

yearly increase of expedition potential of Chinese armed forces. Modern navy vessels, such as aircraft carriers and submarines and expansion of South Sea bases might force Donald Trump to use the US Navy for maintaining the USA's and their Asian allies position. Such action will necessitate a significant spending and might affect the USA's presence in Europe.

Europe's involvement

NATO has to consider the need for Europe's bigger involvement in providing the defense potential. After the Newport and 2016 Warsaw summit, it can be concluded that the aggressive Russian politics concerns the European leaders. Founding of the NATO Response Force

looks like an effort to take over some of the responsibilities of Old Continent's defense. Decisions made in Wales were an ad-hoc attempt to respond to the Russian invasion of Ukrainian territory. The following Warsaw summit was to be a next stage in the development of new NATO doctrine. Four battalion groups were created and rotated through Poland and other Baltic states. USA's armor brigade and infantry elements were placed on the NATO's east flank.

When analyzing the yearly change of defense-destined GDP one may conclude that in the 2014-2018 majority of NATO

states increased their spendings. Further analysis shows a more pessimistic image. In 2011-2018 only Greece, Great Britain and the USA reached the recommended 2% level. Other European countries reached the following levels: 2011 1,55%, 2012 1,52%, 2013 1,49%, 2014 1,44%, 2015 1,42%, 2016 1,44%, 2017 1,46%. This value in 2018 is set to reach 1,50% GDP (data uses prices from 2010). This leads to a sad conclusion: Europe will be dependant on the USA for a long time. This, in connection with tensions between the USA and China, should prime the European leaders for renewal of trans-Atlantic relationships/.



2011-2018 NATO states defense expenditures in millions of dollars

Table 2 : Defence expenditure

Million US dollars

	2011	2012	2013	2014	2015	2016	2017e	2018e
Current prices and exchange rates								
NATO Europe	281,683	263,654	269,434	270,171	235,121	237,921	250,287	285,742
Albania	197	183	180	178	132	131	144	179
Belgium	5,500	5,169	5,264	5,192	4,202	4,315	4,504	5,114
Bulgaria*	758	722	811	747	633	671	723	1,014
Croatia	996	865	850	805	669	623	698	799
Czech Republic	2,437	2,185	2,148	1,975	1,921	1,866	2,255	2,821
Denmark	4,518	4,423	4,217	4,057	3,364	3,593	3,780	4,376
Estonia	389	437	480	513	463	497	540	637
France	53,441	50,245	52,316	51,940	43,474	44,191	46,036	52,025
Germany	48,140	46,470	45,931	46,102	39,813	41,590	45,580	51,009
Greece	6,858	5,633	5,309	5,226	4,517	4,635	4,748	5,004
Hungary	1,472	1,322	1,280	1,210	1,132	1,289	1,468	1,733
Italy	30,223	26,468	26,658	24,448	19,566	22,373	23,852	25,780
Latvia**	286	248	281	293	281	403	512	701
Lithuania**	344	324	355	427	471	636	816	1,062
Luxembourg	232	214	234	253	249	236	325	391
Montenegro	80	68	65	69	57	62	66	87
Netherlands	11,339	10,365	10,226	10,332	8,668	9,108	9,788	13,023
Norway	7,232	7,143	7,407	7,337	5,816	6,064	6,463	7,266
Poland**	9,106	8,710	9,007	10,104	10,596	9,405	9,935	12,088
Portugal	3,652	3,040	3,262	3,003	2,644	2,615	2,702	3,320
Romania**	2,380	2,100	2,452	2,691	2,581	2,645	3,643	4,835
Slovak Republic	1,065	1,020	968	997	986	1,003	1,053	1,320
Slovenia	666	543	507	486	401	449	476	567
Spain	13,984	13,912	12,607	12,614	11,090	9,971	11,864	13,863
Turkey	13,616	13,895	14,427	13,583	11,957	12,649	12,972	15,219
United Kingdom	62,852	58,016	62,258	65,658	59,492	56,964	55,344	61,508
North America	762,784	732,941	699,077	672,092	659,938	673,770	708,424	727,664
Canada	22,040	19,994	18,221	18,150	18,685	17,711	22,467	21,601
United States	740,744	712,947	680,856	653,942	641,253	656,059	685,957	706,063
NATO Total	1,044,467	996,595	968,512	942,263	895,059	911,692	958,711	1,013,406
Constant 2010 prices and exchange rates								
NATO Europe	265,904	260,793	257,691	254,164	255,546	264,766	275,342	288,679
Albania	187	184	177	172	151	148	155	173
Belgium	5,137	5,123	4,996	4,898	4,691	4,754	4,790	4,940
Bulgaria*	681	691	757	695	689	715	748	954
Croatia	952	891	847	808	801	742	800	839
Czech Republic	2,258	2,207	2,138	2,035	2,319	2,210	2,519	2,776
Denmark	4,286	4,421	4,051	3,855	3,805	4,069	4,135	4,376
Estonia	352	414	426	448	479	508	520	555
France	50,438	50,718	50,712	50,098	49,619	50,471	51,273	53,038
Germany	45,374	46,673	43,778	43,201	43,753	45,221	47,909	48,862
Greece	6,490	5,789	5,421	5,444	5,687	5,904	5,905	5,735
Hungary	1,392	1,354	1,265	1,203	1,327	1,508	1,615	1,725
Italy	27,746	25,853	24,536	22,130	20,840	23,352	24,278	24,560
Latvia**	256	232	250	257	295	422	510	629
Lithuania**	312	309	323	385	507	680	821	961
Luxembourg	210	206	213	227	265	254	337	369
Montenegro	75	69	63	66	64	66	67	79
Netherlands	10,670	10,367	9,747	9,766	9,791	10,225	10,627	12,845
Norway	6,530	6,556	6,659	6,947	6,833	7,281	7,458	7,890
Poland**	8,667	8,904	8,910	9,927	12,346	11,427	11,354	12,419
Portugal	3,489	3,155	3,203	2,929	3,023	2,953	2,955	3,317
Romania**	2,195	2,105	2,281	2,478	2,770	2,820	3,683	4,308
Slovak Republic	999	1,022	934	964	1,142	1,170	1,190	1,354
Slovenia	627	551	490	467	456	508	518	560
Spain	13,319	14,327	12,519	12,560	13,130	11,802	13,654	14,490
Turkey	13,970	14,224	14,789	14,873	15,066	16,378	18,299	21,170
United Kingdom	59,368	54,517	58,269	57,399	55,761	59,243	59,222	59,755
North America	746,525	704,836	661,929	629,091	615,331	624,126	643,268	646,878
Canada	20,504	18,557	17,158	18,002	21,594	21,081	25,599	23,637
United States	726,021	686,280	644,772	611,089	593,737	603,046	617,669	623,241
NATO Total	1,012,430	965,629	919,620	883,255	870,878	888,892	918,610	935,557

Notes: Figures for 2017 and 2018 are estimates. The NATO Europe and NATO Total aggregates from 2017 include Montenegro, which became an Ally on 5 June 2017.

* Defence expenditure does not include pensions.

** With regard to 2018, these countries have either national laws or political agreements which call for at least 2% of GDP to be spent on defence annually, consequently these estimates are expected to change accordingly.

Changes in defense spendings of NATO countries as a yearly GDP percentage

Table 3 : Defence expenditure as a share of GDP and annual real change

Based on 2010 prices

	2011	2012	2013	2014	2015	2016	2017e	2018e
Share of real GDP (%)								
NATO Europe	1.55	1.52	1.49	1.44	1.42	1.44	1.46	1.50
Albania	1.53	1.49	1.41	1.35	1.16	1.10	1.11	1.19
Belgium	1.04	1.04	1.01	0.98	0.92	0.92	0.91	0.93
Bulgaria*	1.32	1.34	1.46	1.32	1.26	1.26	1.27	1.56
Croatia	1.60	1.53	1.46	1.40	1.35	1.21	1.27	1.30
Czech Republic	1.07	1.05	1.03	0.95	1.03	0.96	1.04	1.11
Denmark	1.31	1.35	1.23	1.15	1.12	1.17	1.16	1.21
Estonia	1.68	1.90	1.91	1.96	2.05	2.13	2.08	2.14
France	1.86	1.87	1.86	1.82	1.78	1.79	1.78	1.81
Germany	1.28	1.31	1.22	1.18	1.18	1.20	1.24	1.24
Greece	2.38	2.29	2.22	2.21	2.31	2.41	2.38	2.27
Hungary	1.05	1.03	0.95	0.86	0.92	1.02	1.05	1.08
Italy	1.30	1.24	1.20	1.08	1.01	1.12	1.15	1.15
Latvia**	1.01	0.88	0.93	0.94	1.04	1.46	1.69	2.00
Lithuania**	0.79	0.76	0.76	0.88	1.14	1.49	1.73	1.96
Luxembourg	0.39	0.38	0.38	0.38	0.43	0.40	0.52	0.55
Montenegro	1.75	1.66	1.47	1.50	1.40	1.42	1.38	1.58
Netherlands	1.26	1.23	1.16	1.15	1.12	1.15	1.16	1.35
Norway	1.51	1.47	1.48	1.51	1.46	1.54	1.55	1.61
Poland**	1.72	1.74	1.72	1.85	2.22	2.00	1.89	1.98
Portugal	1.49	1.41	1.44	1.31	1.33	1.27	1.24	1.36
Romania**	1.29	1.22	1.28	1.35	1.45	1.41	1.72	1.93
Slovak Republic	1.09	1.09	0.98	0.99	1.13	1.12	1.10	1.20
Slovenia	1.30	1.17	1.05	0.97	0.93	1.00	0.98	1.01
Spain	0.94	1.04	0.93	0.92	0.93	0.81	0.90	0.93
Turkey	1.64	1.59	1.52	1.45	1.39	1.46	1.52	1.68
United Kingdom	2.40	2.17	2.27	2.17	2.06	2.15	2.11	2.10
North America	4.43	4.09	3.77	3.50	3.33	3.33	3.35	3.28
Canada	1.23	1.10	0.99	1.01	1.20	1.15	1.36	1.23
United States	4.78	4.42	4.08	3.77	3.56	3.56	3.57	3.50
NATO Total	2.97	2.81	2.64	2.48	2.39	2.40	2.42	2.40
Annual real change (%)								
NATO Europe	-3.16	-1.92	-1.19	-1.37	0.54	3.61	3.99	4.84
Albania	0.55	-1.32	-4.30	-2.74	-11.76	-2.05	4.40	11.39
Belgium	-2.07	-0.27	-2.48	-1.94	-4.24	1.35	0.76	3.13
Bulgaria*	-18.22	1.54	9.53	-8.28	-0.84	3.88	4.58	27.54
Croatia	3.54	-6.42	-4.92	-4.66	-0.81	-7.45	7.82	4.96
Czech Republic	-15.13	-2.24	-3.13	-4.82	13.94	-4.71	13.97	10.22
Denmark	-4.83	3.15	-8.37	-4.84	-1.29	6.93	1.61	5.83
Estonia	6.05	17.71	2.75	5.26	6.79	6.09	2.46	6.70
France	-2.95	0.55	-0.01	-1.21	-0.96	1.72	1.59	3.44
Germany	-1.91	2.86	-6.20	-1.32	1.28	3.36	5.94	1.99
Greece	-17.86	-10.80	-6.37	0.43	4.46	3.83	0.01	-2.88
Hungary	3.03	-2.72	-6.54	-4.94	10.34	13.60	7.10	6.83
Italy	-3.18	-6.82	-5.09	-9.81	-5.83	12.05	3.97	1.16
Latvia**	2.27	-9.53	7.94	2.55	14.79	43.13	20.97	23.31
Lithuania**	-4.32	-0.90	4.72	19.15	31.64	33.96	20.83	17.02
Luxembourg	-15.15	-2.30	3.71	6.41	16.61	-3.91	32.41	9.54
Montenegro	0.63	-8.11	-8.44	4.49	-3.50	4.33	1.36	18.10
Netherlands	-4.90	-2.84	-5.98	0.19	0.26	4.43	3.93	20.87
Norway	0.47	0.40	1.57	4.32	-1.63	6.55	2.43	5.79
Poland**	2.06	2.73	0.07	11.42	24.37	-7.44	-0.64	9.38
Portugal	-1.45	-9.56	1.51	-8.56	3.24	-2.32	0.07	12.25
Romania**	5.21	-4.08	8.36	8.63	11.78	1.79	30.60	16.98
Slovak Republic	-12.23	2.31	-8.63	3.22	18.53	2.44	1.74	13.72
Slovenia	-18.77	-12.07	-11.19	-4.74	-2.33	11.40	1.95	8.27
Spain	-9.66	7.57	-12.62	0.33	4.54	-10.11	15.69	6.12
Turkey	-1.16	1.82	3.97	0.57	1.30	8.71	11.73	15.69
United Kingdom	-1.59	-8.17	6.88	-1.49	-2.85	6.25	-0.04	0.90
North America	1.00	-5.58	-6.09	-4.96	-2.19	1.43	3.07	0.56
Canada	9.71	-9.50	-7.54	4.92	19.95	-2.38	21.44	-7.67
United States	0.78	-5.47	-6.05	-5.22	-2.84	1.57	2.42	0.90
NATO Total	-0.13	-4.62	-4.76	-3.95	-1.40	2.07	3.34	1.84

Notes: Figures for 2017 and 2018 are estimates. The NATO Europe and NATO Total aggregates from 2017 include Montenegro, which became an Ally on 5 June 2017.

* Defence expenditure does not include pensions.

** With regard to 2018, these countries have either national laws or political agreements which call for at least 2% of GDP to be spent on defence annually, consequently these estimates are expected to change accordingly.

Size of armies

Data concerning the size of armed forces look a bit better. The USA is the biggest army, numbering 1,314 million soldiers. European soldiers add up to 2,004 million together with Canada. This means that NATO has 3,176 mil-

lion armed forces personnel. Polish presence in these statistics looks interesting as in 2015 Polish armed forces numbered 99,000, in 2016 102,000 and in 2017 105,000. Estimated 2018 levels are to reach 118,000 soldiers. This data includes the dynamic development of Wojska Obrony Terytorialnej (Territorial

NATO members size of armies

Table 6 : Military personnel

Thousands

	2011	2012	2013	2014	2015	2016	2017e	2018e
NATO Europe	2,004	1,956	1,862	1,825	1,740	1,718	1,774	1,791
Albania	10	7.9	6.8	6.7	6.2	5.8	6.8	6.8
Belgium	32	31	31	31	30	29	28	27
Bulgaria	29	26	28	27	25	25	25	25
Croatia	16	16	16	15	15	15	15	15
Czech Republic	22	22	20	20	21	23	24	25
Denmark	19	19	18	17	17	17	17	17
Estonia	5.9	6.0	6.3	6.3	6.0	6.1	6.1	6.1
France	227	219	213	207	205	208	208	208
Germany	205	192	184	179	177	178	180	183
Greece	117	110	110	107	104	106	106	105
Hungary	19	19	18	17	17	18	19	19
Italy	192	189	189	183	178	176	175	180
Latvia	4.8	4.7	4.6	4.6	4.8	5.2	5.5	6.3
Lithuania	8.0	8.3	8.4	8.6	12	12	13	15
Luxembourg	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8
Montenegro	1.9	1.9	1.9	1.9	1.7	1.7	1.7	1.7
Netherlands	45	44	42	41	41	40	39	41
Norway	21	21	20	21	21	20	20	20
Poland	97	98	100	99	99	102	105	118
Portugal	35	34	33	31	28	30	28	30
Romania	66	66	66	65	64	63	62	69
Slovak Republic	13	13	12	12	12	12	12	13
Slovenia	7.2	7.1	6.9	6.8	6.6	6.5	6.3	6.8
Spain	127	125	122	122	122	121	118	121
Turkey	495	495	427	427	385	359	416	386
United Kingdom	191	184	179	169	141	139	137	145
North America	1,493	1,467	1,450	1,404	1,384	1,372	1,379	1,385
Canada	68	68	68	66	70	71	71	71
United States	1,425	1,400	1,382	1,338	1,314	1,301	1,308	1,314
NATO Total	3,497	3,423	3,312	3,229	3,125	3,090	3,153	3,176

Notes: Figures for 2017 and 2018 are estimates. The NATO Europe and NATO Total aggregates from 2017 include Montenegro, which became an Ally on 5 June 2017.

Procurement

Numerous army, however, leads to difficulties in budget balancing. When money is needed for soldiers savings are usually made by cutting the spending on procurement and infrastructure maintenance. From this perspective, it looks like the Polish Army has this problem. Data from 2016 and 2017 show that accordingly 47,15% and 49,99% of the overall defense budget was spent on manpower. Equipment expenditure was at the 21,62% and 22,04% levels but the data for 2017 are approximate. Such budget balancing imprints on key modernization programs of the Polish Army. Until the middle of 2018, only the Leopard 2 to Leopard 2 PL programme was started and the agreement for the purchase of 2 Patriot missile batteries was signed. The rest of the biggest and most expensive programs, like procurement of multi-mission helicopters, purchase of assault helicopters (Kruk programme), procurement of short-range anti-aircraft weapons (Narew programme), purchase of new generation submarines (Orka) and replacing the BWP-1 infantry fighting vehicles are suspended.

New initiative

As a part of NATO expansion on the Old Continent a new readiness initiative will be started. NATO will have 30 mechanized battalions, 30 airforce squadrons, and 30 navy vessels. Units are to be ready for action in 30. The whole initiative gained a 4 by 30 nickname. During the Brussels summit, new commands were also established. Atlantic command will have its base in Norfolk, Virginia and logistic support command will be based in Ulm. Additional Cyber Operations Center will be formed in Supreme Headquarters Allied Powers Europe (SHAPE) HQ in Mons.

NATO HQ based their presentation on official data obtained from members. The data includes spending on each branch of armed forces, foreign missions and administration. Military pensions paid by the ministries of defense are also encapsulated. Some of the figures use prices from 2010.



📄 JAKUB LINK-LENCZOWSKI

📍 NATO HQ



Percent share of expenditure on modernization (part a) and manpower (part b) in member state`s budgets

Table 3 : Defence expenditure as a share of GDP and annual real change

Based on 2010 prices

	2011	2012	2013	2014	2015	2016	2017e	2018e
Share of real GDP (%)								
NATO Europe	1.55	1.52	1.49	1.44	1.42	1.44	1.46	1.50
Albania	1.53	1.49	1.41	1.35	1.16	1.10	1.11	1.19
Belgium	1.04	1.04	1.01	0.98	0.92	0.92	0.91	0.93
Bulgaria*	1.32	1.34	1.46	1.32	1.26	1.26	1.27	1.56
Croatia	1.60	1.53	1.46	1.40	1.35	1.21	1.27	1.30
Czech Republic	1.07	1.05	1.03	0.95	1.03	0.96	1.04	1.11
Denmark	1.31	1.35	1.23	1.15	1.12	1.17	1.16	1.21
Estonia	1.68	1.90	1.91	1.96	2.05	2.13	2.08	2.14
France	1.86	1.87	1.86	1.82	1.78	1.79	1.78	1.81
Germany	1.28	1.31	1.22	1.18	1.18	1.20	1.24	1.24
Greece	2.38	2.29	2.22	2.21	2.31	2.41	2.38	2.27
Hungary	1.05	1.03	0.95	0.86	0.92	1.02	1.05	1.08
Italy	1.30	1.24	1.20	1.08	1.01	1.12	1.15	1.15
Latvia**	1.01	0.88	0.93	0.94	1.04	1.46	1.69	2.00
Lithuania**	0.79	0.76	0.76	0.88	1.14	1.49	1.73	1.96
Luxembourg	0.39	0.38	0.38	0.38	0.43	0.40	0.52	0.55
Montenegro	1.75	1.66	1.47	1.50	1.40	1.42	1.38	1.58
Netherlands	1.26	1.23	1.16	1.15	1.12	1.15	1.16	1.35
Norway	1.51	1.47	1.48	1.51	1.46	1.54	1.55	1.61
Poland**	1.72	1.74	1.72	1.85	2.22	2.00	1.89	1.98
Portugal	1.49	1.41	1.44	1.31	1.33	1.27	1.24	1.36
Romania**	1.29	1.22	1.28	1.35	1.45	1.41	1.72	1.93
Slovak Republic	1.09	1.09	0.98	0.99	1.13	1.12	1.10	1.20
Slovenia	1.30	1.17	1.05	0.97	0.93	1.00	0.98	1.01
Spain	0.94	1.04	0.93	0.92	0.93	0.81	0.90	0.93
Turkey	1.64	1.59	1.52	1.45	1.39	1.46	1.52	1.68
United Kingdom	2.40	2.17	2.27	2.17	2.06	2.15	2.11	2.10
North America	4.43	4.09	3.77	3.50	3.33	3.33	3.35	3.28
Canada	1.23	1.10	0.99	1.01	1.20	1.15	1.36	1.23
United States	4.78	4.42	4.08	3.77	3.56	3.56	3.57	3.50
NATO Total	2.97	2.81	2.64	2.48	2.39	2.40	2.42	2.40
Annual real change (%)								
NATO Europe	-3.16	-1.92	-1.19	-1.37	0.54	3.61	3.99	4.84
Albania	0.55	-1.32	-4.30	-2.74	-11.76	-2.05	4.40	11.39
Belgium	-2.07	-0.27	-2.48	-1.94	-4.24	1.35	0.76	3.13
Bulgaria*	-18.22	1.54	9.53	-8.28	-0.84	3.88	4.58	27.54
Croatia	3.54	-6.42	-4.92	-4.66	-0.81	-7.45	7.82	4.96
Czech Republic	-15.13	-2.24	-3.13	-4.82	13.94	-4.71	13.97	10.22
Denmark	-4.83	3.15	-8.37	-4.84	-1.29	6.93	1.61	5.83
Estonia	6.05	17.71	2.75	5.26	6.79	6.09	2.46	6.70
France	-2.95	0.55	-0.01	-1.21	-0.96	1.72	1.59	3.44
Germany	-1.91	2.86	-6.20	-1.32	1.28	3.36	5.94	1.99
Greece	-17.86	-10.80	-6.37	0.43	4.46	3.83	0.01	-2.88
Hungary	3.03	-2.72	-6.54	-4.94	10.34	13.60	7.10	6.83
Italy	-3.18	-6.82	-5.09	-9.81	-5.83	12.05	3.97	1.16
Latvia**	2.27	-9.53	7.94	2.55	14.79	43.13	20.97	23.31
Lithuania**	-4.32	-0.90	4.72	19.15	31.64	33.96	20.83	17.02
Luxembourg	-15.15	-2.30	3.71	6.41	16.61	-3.91	32.41	9.54
Montenegro	0.63	-8.11	-8.44	4.49	-3.50	4.33	1.36	18.10
Netherlands	-4.90	-2.84	-5.98	0.19	0.26	4.43	3.93	20.87
Norway	0.47	0.40	1.57	4.32	-1.63	6.55	2.43	5.79
Poland**	2.06	2.73	0.07	11.42	24.37	-7.44	-0.64	9.38
Portugal	-1.45	-9.56	1.51	-8.56	3.24	-2.32	0.07	12.25
Romania**	5.21	-4.08	8.36	8.63	11.78	1.79	30.60	16.98
Slovak Republic	-12.23	2.31	-8.63	3.22	18.53	2.44	1.74	13.72
Slovenia	-18.77	-12.07	-11.19	-4.74	-2.33	11.40	1.95	8.27
Spain	-9.66	7.57	-12.62	0.33	4.54	-10.11	15.69	6.12
Turkey	-1.16	1.82	3.97	0.57	1.30	8.71	11.73	15.69
United Kingdom	-1.59	-8.17	6.88	-1.49	-2.85	6.25	-0.04	0.90
North America	1.00	-5.58	-6.09	-4.96	-2.19	1.43	3.07	0.56
Canada	9.71	-9.50	-7.54	4.92	19.95	-2.38	21.44	-7.67
United States	0.78	-5.47	-6.05	-5.22	-2.84	1.57	2.42	0.90
NATO Total	-0.13	-4.62	-4.76	-3.95	-1.40	2.07	3.34	1.84

Notes: Figures for 2017 and 2018 are estimates. The NATO Europe and NATO Total aggregates from 2017 include Montenegro, which became an Ally on 5 June 2017.

* Defence expenditure does not include pensions.

** With regard to 2018, these countries have either national laws or political agreements which call for at least 2% of GDP to be spent on defence annually, consequently these estimates are expected to change accordingly.



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M762 BERYL MANUFACTURING IN NIGERIA



Representatives of Polska Grupa Zbrojeniowa (PGZ) and Defence Industries Corporation of Nigeria (DICON) signed a letter of intent on the 26th of March 2018. The signing ceremony took place in Fabryka Broni Lucznik in Radom. The letter concerns manufacturing of Beryl M762 automatic rifles for 7,62x39 ammunition and contains regulations and conditions for 3-stage transfer of manufacturing technology



PGZ was represented by Jakub Skiba (President of the Management Board) and Pawel Pelc and Michal Kuczmierowski (Members of the Board). DICON representation included General Bamidele Ogunkale (the CEO) and Kike Abiodun Bello (the Director of the Law Department). The letter of intent was signed in the presence of Polish Ministry of National Defence Secretary of State – Sebastian Chwalek.

Beryl M762 is an equivalent of wz. 96C assault rifle, introduced into Polish Army in 2009. Polish weapons use the 5,56x45 ammunition while the export variant shoots the 7,62x39 round and is compatible with AK/AKM magazines.

Beryl M762

For years, Fabryka Broni was asked to develop a variant of Beryl rifle for the popular 7,62x39 mm Russian ammunition. This round is still widely used in many African and Asian countries and it became popular during and after the cold war when tens of thousands of AK/AKM weapons were delivered throughout the world.

The first attempt at 7,62 mm Beryl was presented in 2009 in London during the DSEi show. The modified version of AKS with milled upper receiver was named Aktyn and showed at the trade show. The weapon, similar to wz. 96C, had an enlarged magazine release, a protrusion on the fire selector and an elongated upper receiver. The welded element allowed for universal rail mounting. Beryl for 7,62x39 mm ammunition was developed in 2013 and was kind of a back to the past project. The original weapon for 5,56x45 mm ammunition was created by a redesign of wz. 88 for 5,45x39 mm ammunition which was, in fact, a serious modification of 7,62x39 mm AKM.

The M762 rifle was shown in 2013 to various officials visiting the MSPO and wasn't on public display. The official debut took place at MSPO 2014, after signing of the first contract with Nigeria.

From the mechanical and usability point of view, the M762 Beryl for 7,62x39 mm ammunition is an equivalent of wz. 96C rifle for 5,56 mm ammo used by the Polish army. The weapon has a 419-mm barrel, a bit longer than 415-mm in the AK/AKM and 38 mm shorter than 457-mm barrel



Beryl M762 is an equivalent of wz. 96C model and differs by the 7,62x39 mm ammunition



Letter of Intention signature ceremony between Polska Grupa Zbrojeniowa and Defence Industries Corporation of Nigeria. The letter concerns manufacturing of M762 rifles in Nigeria

used in wz. 96. Initially, the barrel was supposed to measure 415 mm, just like in AK but the decision was made to extend it to accommodate exchangeability of elements used with wz. 96. The elements included 147-mm long 6H4 bayonet and underslung grenade launchers. M762 Beryl was made

compatible with both older wz. 74 Pallad and GP40 made by Zaklady Mechaniczne Tarnow and new GPBO-40 made by Zaklady Metalowe Dezamet.



AKS-based Aktyn rifle was the first attempt of Fabryka Broni at getting back to manufacturing weapons for 7,62x39 mm round. The weapon was showcased during the 2009 DSEi show in London



First deliveries of 1000 Beryl M762 rifles took place in February 2015 and the weapons were sent to elite units of Nigerian armed forces

Main visual difference between the 5,56 mm and 7, 62 mm Beryls is the magazine. M762 uses the standard AK/AKM magazine and the Nigeria export versions are sent with 4 of 30-round steel magazines. Fabryka Broni developed a transparent, polymer magazine for M762, similar to the one used in wz. 96 but Nigerians required the standard, steel version.

Beryl M762 is equipped in exactly the same way as wz. 96C. It has an adjustable stock, universal accessory rails on hand-guard and gas pipe cover, ergonomic pistol grip, enlarged controls and a front grip. It is possible to mount an optoelectronic sight above the upper receiver. It is also equipped with a 3-position fire selector (single fire, 3 round burst, auto) on the left side. Even the muzzle device is the same as in wz. 96C 5,56 mm rifle. It also accepts a threaded insert for firing blanks.

During the development process, two variants of Beryl M762 were made. First



Various sources confirm than Nigerians like the Polish weapon. This resulted in increased orders for other branches of armed forces and the current plans for license production by DICON

had a safety connected with the fire selector, similarly to the solution used in the original Kalashnikov. The second variant had separate manipulators, just as in wz. 96. Safety lever was located on the right and fire selector on the left of the upper receiver. The latter version was ordered by Nigerian armed forces and it can fire not only in single or auto mode but also has a 3-round burst option.

Nigerian manufacturing

Initial plans for assembly and manufacture of Polish weapons in Nigeria were drafted in 2016 when the Nigerian's allocated NGN364 million (EUR82 million) for the creation of manufacturing line of the M762 rifles. At the same time, the Nigerian government reserved NGN390 million (EUR88 million) to establish a production line of AK-47 rifles.

The AK's supposed to be local clones, based on the OBJ-006 model developed in 2004.

Since 1990, Nigeria is departing from 7,62x51 rifle ammunition and converting to 7,62x39 mm and 5,56x45 mm intermediate rounds. Nigerian armed forces and uniformed services are benefiting from the huge availability of ex-Warsaw Pact AK/AKM weapons and ammunition. The 7,62x39 mm round is the one preferred by military and other services.

DICON

Defence Industries Corporation of Nigeria is a state-owned company, subordinated to Nigerian armed forces. It consists of 14 separate manufacturers and its HQ is in Kakuri district of 1,3 million city of Kaduna, together with ORDFAC (Ordnance Factory)



Beryl M762 was demonstrated in 2013 during the MSPO but never showed to the general public. This happened a year later after the contract with Nigerians was signed

complex A, B, C, and D. Tooling manufacturing facilities, school and other entities are located in the same place.

Kaduna Ordnance Factories is the only manufacturer of firearms in Nigeria. It was founded in 1964 in cooperation with German Fritz Werner company (which was owned by West Germany government since the 2nd World War, right up to denationalization in 1990). Fritz Werner specialized in design and development of weapons and ammunition production lines.

Germans helped to implement the assembly of Beretta BM59 semi-automatic rifles (M1 Garand modified for 7,62x51 ammunition and fed by the 20-round magazine) and SMG 12 machine pistols (Beretta Model 12). 7,62x51 and 9x19 mm ammunition manufacturing were also introduced. The factory had its best days during the 1967-1970 civil war, when the production capabilities were 5000 of BM59s, 18000 of SMG 12, 12 million of 7,62x52 mm ammunition and 4 million of 9x19 mm ammunition, per year.

Belgian license

In 1972 the factory went bankrupt for the first time and the German managing director was forced to leave the country, accused of mismanagement. The factory was saved by the Nigerian army, which 5 years later decided to unify their firearms, and Belgian weapons were chosen for this process.

Between 1977 and 1978, DICON purchased a license for FN-FAL rifles from FN-Herstal. These firearms were called NR1 (Nigerian Rifle Model 1) and fired 7,62-mm rounds. Other licenses procured covered manufacture of 9-mm Browning HP pistols (NP1, Nigerian Pistol Model 1) and 7,62-mm FN MAG58 machine guns (GPMG, General Purpose Machine Gun).

Since the 1980's, Kaduna-located factory was developed and adapted to mass production needs by Belgians. In 1983



First training in Beryl use for Nigerian soldiers. Lucznik representatives also took part in these activities



Nigerian Army commando armed with the Beryl M762 rifle. Note the high capacity drum magazine manufactured by Chinese or South Korean company

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weapons were assembled from parts delivered from Belgium. Four years later factory achieved full production capabilities and in 1988 decision was made to stop importing any parts from abroad. Since then, all the elements were made locally. The NR1 assault rifle was officially introduced into the armed forces in 1989.

In 1990, production capabilities were estimated at 15000 NR1 rifles, 10000 NP1 pistols, and 1000 MAG58 machine guns. At the same time, Kaduna factory also produced 12 DICON SG1-86 shotguns.

Contemporary times

Political unrest, economic problems and international sanctions from 1990, were ruining the factory. This resulted in a massive discharge

of workforce in 2000. After the domestic situation stabilized, the new democratic government started financing the factory in 2004. There were some small orders to fulfill and overdue salaries were paid out to encourage people to come back to work. At the same time, work started on the local Kalashnikov clone. Prototypes were built in February 2006 and in October 2006 were presented, by the current DICON CEO Nnameka Charles Maduegbunam, to the Nigerian President, Olusegun Obasanjo. To commemorate the President, the 7,62-mm rifle was named OBJ-006. Trials were finished in November 2006. In the meantime, Kaduna factory adaptation to OBJ-006 manufacturing was ongoing. The

M762 rifles being presented to the President of Nigeria during the visit to Nigerian Air Force base in June 2017. Air Force was the next user, after land forces and military school, of the Polish weapon



In 1977-1978 DICON purchased from FN Herstal a license to manufacture the FN FAL 7,62-mm rifles. These weapons were named NR1 (Nigerian Rifle Model 1) in Nigeria and were officially introduced into service in 1989



firearm is visible on the DICON website but we are unsure if the actual manufacturing has ever started.

Besides the new rifle, the D&D department developed a local model of RPG-7 anti-tank grenade launcher (named RPG) and mortars in 60 and 81 mm caliber. The factory also produced tripods for machine guns and ceremonial swords. For the civilian market, DICON manufactures single barrel shotguns and windmills.

Ammunition factory in Kachia is also currently undergoing development. In 2017, Nigerians build a primer production line. The primers are for 7,62x39 mm ammunition as it was chosen as standard in Nigerian armed forces.

M762 deliveries

The signing of the letter of intent is a direct result of the cooperation between Fabryka Broni and Nigerian armed forces. The cooperation started a few years back and, since then, Fabryka Broni provided Nigerians with over 2000 of rifles. The first contract, signed in 2014, was valued at PLN3,3 million (EUR782,813) and resulted

30-round polymer magazine, same as used with wz. 96C was developed for the Beryl M762. Nigerians, however, requested the standard steel magazines to be delivered with the rifles




in the delivery of 1000 Beryl M762 rifles in 2015. Weapons were handed over to 72. Mobile Strike Force – an elite unit which operates in the north of Nigeria.

Next contract was signed in 2015 and concerned delivery of 500 M762 and 10 Mini-Beryl M556 rifles. The M556 is the export version of wz. 96C used by Polish Army. A small batch of these was to be used by Nigerians for testing and their armed forces were also interested in ordering a shortened version of Beryl M762 from Fabryka Broni.



In June 2017, Beryl M762 were delivered to another branch of Nigeria's armed forces. Five hundred were ordered by the NAR (Nigerian Air Force). Negotiations for another delivery of Polish weapons for Nigerian Air Force are currently in progress (Beryl M762 rifles for Nigeria, 2017-04-12).

In 2016, Nigeria budget proposal included procurement of 500 Beryl M762 assault rifles and 500 of Beryl RTT training replicas for the Nigerian Defence Academy (NDA) in Kaduna. The amounts budgeted were

as follows: NG184 million (EUR415,000) for the assault rifles and NGN177 million (EUR396,000) for the training replicas. So, the unit price would be NGN369,600 (EUR829) for the live ammunition version and NGN353,100 (EUR792) for the training model.

As MILMAG found out, the Nigeria Defence Academy ordered the first batch of 300 M762 Beryl's and 500 RTT Beryl's. Weapons were sent to Nigeria between March and April 2018. More deliveries for the same receiver are planned. 



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Beryl's M762 barrel is 419 mm, a bit shorter than 457 mm used in wz. 96C rifle but longer than 415 mm barrel of the AK/AKM weapons. This change resulted in compatibility with bayonet and underslung grenade launchers

THE PAC'S RIFLE PREMIERE

AR-15
BORN IN RADOM

2018 WAS A VERY FRUITFUL YEAR WHEN IT COMES TO DOMESTICALLY-PRODUCED FIREARMS. MAYBE IT WAS JUST A CHANCE THAT THIS CORRESPONDS WITH A 100-YEAR ANNIVERSARY OF POLISH INDEPENDENCE OR MAYBE THE RIGHT IS JUST RIGHT FOR THIS. SEMI-AUTO VERSION OF MSBS-5,56 IS TO REACH THE POLISH MARKET SOON. ALSO SALES OF PAC15 RIFLES IS TO START. IT'S A POLISH AR-15 CLONE FROM RADOM, POLISH CAPITAL OF FIREARMS PRODUCTION.



Quarter of a century ago the American AR-15 was an unreachable dream for Polish firearm enthusiast. Besides few dozens of M16A1 owned by Polish Army and provided by Vietnam in 1970's (to study the weapons used by *imperialistic enemy*), there were no *black rifles* present in Poland. The 5,56x45 mm/.223 Remington ammunition was similarly scarce. Old Polish designs were the staple of the 1990's collections.

By the end of nineties cheap AKM's, sold out by Military Property Agency (Agencja Mienia Wojskowego, AMW), Radom Hunters (semi-automatic hunting variant of AKM) and Czechoslovakian vz. 58 (in CZ-858 variant) were the most popular. Until the change of weapons ownership regulations in 2011 Polish market was rather small and even when AR-15 clones appeared, these were only the cheap German and Czech clones. Later on this was supplemented by the cheapest American *black rifles* usually manufactured by STAG Arms.

A few years had passed and there are dozens of AR-15s in Polish shops, produced both in Europe and in USA. Armalite- or

Colt-manufactured rifle isn't difficult to get. However, until recently it was impossible to find a domestically-produced *black rifle* in Poland.

Krakow was the first

Situation changed few years ago when Krakow-based Gunshelp company started to assemble their GH-15 weapons from purchased elements. Soon enough ambitious company started their own manufacturing process and elements such as lower and upper receivers, handguards and trigger mechanisms are still produced in small scale in the old Polish capital. The production scale is such that the weapon can only be ordered directly from the manufacturer and isn't available for wider distribution.

GH-15 is in the upper price tier. The barrels are German, from Lothar Walther manufacturer and the final configuration is decided by the buyer. AR's from Krakow have an

The AR-15 rifle was developed in 1956 by American Fairchild Engine and Airplane Corporation, branch of ArmaLite. The weapon designed for 5,56x45 mm ammunition was created by Jim Sullivan and Robert Fremont and was based on 1955 Eugene M. Stoner's AR-10 rifle chambered in 7,62x51 mm. Due to its lack of success on the military markets licenses were transferred in 1959 to the Colt's Patent Firearms Manufacturing Company (In 1957 a 5-year licence for AR-10 was purchased by Artillerie Inrichtingen from Netherlands). As soon as September 1959 Cold sold the first rifles to Malaysians and in 1960 a first order from American Air Force (USAF) was confirmed. Modified XM16E1 and M16 rifles were purchased in 1963 by US Army and USAF. At the same time semi-auto Colt AR-15 variants started to reach the civilian market. Today it's one of the most popular firearms, right next to M1911 and Glock pistols, and AK rifles in the USA. Nowadays, AR-15 is manufactured in countless versions, differing in things such as internal mechanisms and ammunition. However, the main round is still the 5,56x45 mm/.223 Remington.



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adjustable gas block, Lantac muzzle device and ambidextrous safety switch. Gunshelp also offer gas piston models. All those choices and additions place the GH-15 in the higher price-range group.

Radom was the second

Pioneer Arms Corp. (PAC) is a Polish firearms manufacturer. Their production facilities are located on the grounds of old Zakłady Metalowe Lucznik in Radom. At first, the company modified and sold on American market the weapons procured

from Agencja Mienia Wojskowego. Later, PAC started their own manufacturing under the AK from Radom name and produced AKM clones and short-barreled versions for 7,62x29 mm ammunition. All elements of the weapons, including the broached barrels, are manufactured by PAC and their Interarms subsidiary specializing in precision casting.

In 2017 Pioneer Arms Corp. informed that work on Polish AR-15 clone is starting. The initial designation of the new weapon was PAC15. Pioneer Arms Corp. is a privately-owned company known from its business approach to firearms manufacturing. This

The men behind the AR from Poland, Paweł Józwick fires the PAC15 semi-automatic rifle





Before shooting started, media representatives from Poland were given a chance to carefully examine the PAC15 rifles. For the presentation weapons were equipped with Holosun reflex sights

was a good guarantee that the project might reach its final stage. Introduction of large-scale manufacturing process is lot more complex than assembling few dozens of rifles. The delays in PAC15 introduction were somewhat expected. PAC had experience in large-scale manufacturing of the AKM weapon systems but the black rifle is different. For small-scale production, precision casting was enough. For larger quantities milling becomes a necessity. Initial plans assumed that a lot of components will be provided by subcontractors and there won't be a need to purchase expensive CNC milling machines. PAC quickly realized that components manufactured outside of their facilities had quality issues and it would be more beneficial to expand on their capabilities while maintaining their own standards. This resulted

in a huge expansion of their machining equipment. Thanks to this, PAC15 won't be a niche project and the rifles will be available through not only the manufacturer but also majority of firearms retailers in Poland.

Premiere

The PAC15 premiere was rescheduled quite a few times. In the end, the decision was made that the unveiling of AR from Radom project will take place on the 8th and 9th of June 2018 at the FSO range in Warsaw. First day was a closed event for media, on the second everyone could try the new weapon. MILMAG Military Magazine was also invited. During the media day, we had a chance to carefully examine the available variants of PAC15. Rifles are offered with

Pioneer Arms Corp. (PAC) is a Polish firearms manufacturer. Their production facilities are located on the grounds of old Zakłady Metalowe Lucznik in Radom. At first, the company modified and sold on American market the weapons procured from Agencja Mienia Wojskowego. Later, PAC started their own manufacturing under the AK from Radom name and produced AKM clones and short-barreled versions for 7,62x29 mm ammunition. All elements of the weapons, including the broached barrels, are manufactured by PAC and their Interarms subsidiary specializing in precision casting.

267 mm/10,5 inch, 368 mm/14,5 inch, 406 mm/16 inch, 457 mm/18 inch and 508 mm/20 inch barrels. The longest version was named PAC15 Classic. Static, dynamic, tactical and recreational shooters will be interested in PAC offer.

For sport and for fun

The PAC15 variants with 10,5-18 inch barrel are very similar. All are equipped with a correct length handguards and adjustable stocks. There are no iron sights and each

PAC15 with 10,5-inch barrel was shown in its final iteration. The only difference from the commercial models was the stock. The final version of the stock was presented on the other variants of the AR from Radom firearms



has an A2 pistol grip with a pronounced ridge between middle and other fingers. Universal rail is located on the top of the upper receiver and it connects with the handguard rail. Handguard itself is fantastic: light, narrow and equipped with Magpul's M-LOK mounting points. It's exactly right for an AR-15.

The stock isn't so good. It's a 6-position, L-shaped model and will have AR from Radom logo in the final version. Various colours of the stock were presented on the premiere but black will be the only available version when distribution starts. While the handguard is great, the stock isn't. It is, however, adequate for the job

and the choice of this particular stock was a business decision by PAC. It's supposed to reduce the manufacturing costs and the final price. And obviously, stock can be replaced by pretty much anyone.

PAC15 Classic

The variant equipped with the 508 mm barrel looks a bit different and resembles the M16A4 used by the military. It has a round, 2-part polymer handguard and a large, fixed stock. Everything is coloured in black. Front sight base is fixed and doubles as a gas block. Base also has attachment points for M7/M9





PAC15 10.5 with 267-mm/10,5-inch barrel



bayonet and a rifle sling. Rear sight is the A2 standard, identical to original M16A4 and is integrated with a carrying handle. The handle is located on the top universal rail. Unfortunately 508 mm variant wasn't shown at the premiere, but MILMAG had a chance to examine it before, while visiting the PAC facility in Radom.

First impressions

Expectations were high but the PAC15 rifles are surprisingly good. Quality of manufacturing is very high and weapons function nicely. Durability seems good as well - at least to the level we could test it while observing 1,200 rounds fired from each of four variants. Trigger



Basic characteristics of PAC15 rifles

Barrel length [in.]	Barrel length [mm]	Total length [mm]	Mass [kg]
10,5	267	710	2,7
14,5	368	860	2,9
16	406	880	3,0
18	457	920	3,1
20	508	1010	3,4

All PAC15 barrels end with 5-slot, A2 type muzzle devices, resembling the model used in military M16A2/M4 rifles. The device is attached via the typical 1/2x28 TPI thread and can be easily replaced with any muzzle device



PAC15 14.5 with 368-mm/14.5-inch barrel



mechanism is worth mentioning, it feels good and is suitable for double and multiple shots. The 267 mm/10,5-inch variant was the most interesting. Recoil and jerk were the lowest among the presented versions. According to PAC15 representatives, the shortest version was the most developed one at the time of the premiere. It was presented in its final iteration while other versions were still undergoing development process.

It's important to mention that Pioneer Arms Corp. designed their PAC15 with cost/effect ratio in mind. Radom-manufactured AR-15 does not have ambidextrous manipulators, solid trigger guard, magazine well finger cutout, or a muzzle device. However the AR-15 from Radom can be used straight out of the box and can be adjusted to user's requirements at fairly low cost. Also, the weapon's weight is on the low side.



Sales of AR from Radom rifles is to start at the beginning of August. This coincides with the anniversary of the Warsaw Uprising so the manufacturer decided to introduce a limited run of 63 weapons to commemorate the anniversary. Limited weapons will have the serial numbers of PW194401 to PW194463. Interested buyers can choose from any variant which will be then adorned with additional laser markings. Moreover, the weapon will be delivered with a steel magazine adorned with *Polska Walczaca* sign. Money received from these weapons will be used to supplement the budget for an air guns shooting range to be located in the Warsaw Uprising 1944 (Powstanie Warszawskie) veterans support home which is being built in Warsaw. The shooting range was requested by veterans.



PAC15 16 with 406-mm/16-inch barrel



Barrel

Barrels in PAC15 rifles are made of 4150 alloy steel and rifled, like the rest of Radom-manufactured, by broaching. Twist rate is the military 178 mm/7 inches. This makes the weapon more compatible with heavier bullets but should not create ac-

curacy problems when using the typical 55-grain/3,6 g ammunition. Barrels are not chrome plated so cleaning after using lower-quality ammo is a must. PAC 15 uses the .223 Wylde standard chamber which is sort of in between the loose military chamber for 5,56x45 mm NATO round and the tight, sports chamber for .223 Remington. This solution enables



the user to fire both types of ammo without worrying about possible malfunctions. All PAC15 barrels end with 5-slot, A2 type muzzle devices, resembling the model used in military M16A2/M4 rifles. The device is attached via the typical 1/2x28 TPI thread and can be easily replaced with any muzzle device.

Gas block

In the 10,5 inch variant of PAC15, the gas block is located in the carbine position. 14,5 and 16-inch versions have the blocks in mid-length position. This is by design as the American Naval Surface Warfare



PAC15 18 with 457-mm/18-inch barrel



Center – Crane Division judged that this location the most effective for AR-15's with 368 mm and similar barrels. The 18 and 20-inch PAC15 variants have the gas block in rifle position and the gas tube's length is identical to the M16A2 military rifle.

[Bolt and bolt carrier](#)

Bolt and bolt carrier, the rifle's core, is made of 8150 alloy steel. Carrier's interior

(serving as a gas chamber and a piston) and gas key interior are chrome plated. This ensures better resistance to corrosive by-products of combustion. This feature is rarely found in the lower- and middle- price AR-15 clones. To ensure the bolt quality High Pressure Test is conducted by firing a bigger charge round. PAC also utilizes Magnetic Particle Inspection to detect potential material problems.



Bolts of ARFR rifle are tested with a high pressure round and then by Magnetic Particle Inspection





PAC15 Classic with 508-mm/20-inch barrel

The PAC15 rifle upper and lower receiver with Pioneer Arms Co. distinctive markings. Four out of five PAC15 variants were shown during the premiere. The PAC15 Classic (M16A4 look-alike) wasn't available but MILMAG managed to examine it before in Radom.





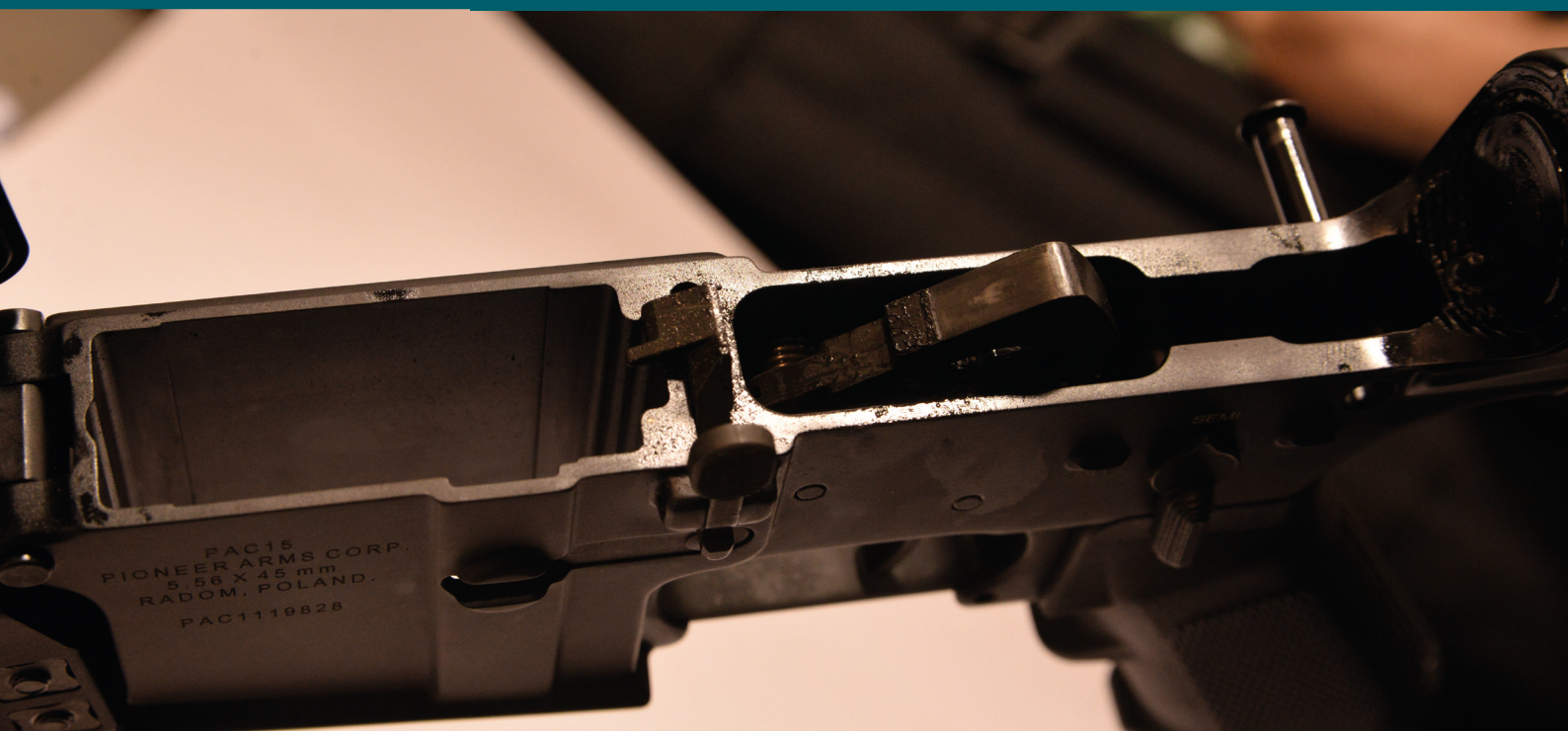
Upper and lower receivers

Both these parts of PAC15 are made to resemble the standard military parts. PAC15 does not have an integral trigger guard, mass-reducing perforations or special looks to improve the aesthetics. This would only increase the price. Receivers are made of

7075-T6 aluminium alloy – probably the favourite material for AR receivers manufacturing. Parts are cut from a single block of forged aluminium so the elements are more resilient due to increased material density.

When shaping is completed, parts are finished with black anodizing. The right side of the magazine well receives a laser-cut

The trigger mechanism of PAC15 rifles works really well and with just right resistance. It's not a competition trigger but wasn't created as such





After a quick safety briefing, MILMAG's representatives started the best part of the premiere - the shooting. Shortest PAC15 made the best impression - very low recoil and jerk were noticeable.

logo within an oval shield. Radom and number 11 are a direct reference to old Zakłady Metalowe Lucznik. Beneath the logo, *Poland* is lasered. Left has manufacturers markings of PAC15, *PIONEER ARMS CORP.*, *5x56 x 45 mm*, *RADOM*, *POLAND* and the serial number starting with PAC.

Controls

PAC15 rifles have a standard set of controls, identical to M16A2/M4. The safety is located on the left side of the upper receiver, just under the thumb of the grip hand. Magazine release is actuated by the right hand's index

When shooting was completed internal mechanisms of brand new and used rifle were compared. There were no marks on the internals after firing off a few hundred rounds



finger. The bolt carrier release lever is serviced with left hand's thumb after the magazine was changed. All the controls can be replaced with commercially available parts.

The T-shaped charging handle is located at the end of the upper receiver. It's also standard, with a single lever located on the left for locking in the start position.

The safety itself gives a nice, positive resistance when actuated. The operations are safe and quick and there is no need for excessive force, typical for some of the even more expensive clones.

When? How much?

The PAC15 semi-automatic rifles will be sold with a single 30-round steel magazine manufactured by PAC. Aluminium

handguard/adjustable stock models will cost PLN 4,299 (EUR 999), regardless of barrel's length. The 20-inch barrel variant PAC15 Classic will be more expensive at PLN 4,779 (EUR 1,115). All PAC produced AR-15 clones have 12 months or 10,000 round warranty.



✉ JOACHIM RAŻNY
📷 PAWEŁ ŚCIBIOREK
AR FROM RADOM

PAC15 rifles seem accurate, at least for a 25-meter distance when shooting from standing position. Small recoil allows for better retargeting





TEST:
RED DOT SIGHT
HOLOSUN HS403GL
FOR A SHOOTING RANGE, NOT QUITE FOR WAR

Electronic sights' prices drop increased their popularity. Currently, it's hard to find rifle without reflex sight attached. Military models such as Aimpoint and L3/EOTech are still expensive, but most shooters don't need sights capable of surviving 500-lbs. bomb explosion. Civilian market offers cheaper red dot sights, produced by companies such as Delta Optical, Vortex Optics, and VOMZ, as well as Holosun Technologies, whose



Reflex sights (also called reflector sights), which red dot sights are a category of, allow firing without closing one eye. The shooter does not need to restrict his field of vision and retains greater situational awareness. This can be a decisive factor in dynamic competition and real combat.

Reflex Sights

From the technical side, these are constructions that utilize collimated light—rays of light with little divergence of each other—that is emitted along the axis of aiming. Majority of reflex sights don't magnify the image.

Early reflex sights emitted an opaque beam from laser diode directly toward the shooter's eye. One eye was used to watch the target while the other focused on the light dot. The first commercial electronic sight using that

solution was Aimpoint Electronic created in 1975 by Swedish company Aimpoint.

Modern transparent models have the light-emitting element placed below the targeting line. The light beam is projected onto a special filter or reflecting surface. The shooter sees the target in the lens with a light dot superimposed over it.

Electronics development allowed for miniaturization of necessary components. The parts that were bulky, heavy, and hard to fit in the past now became conveniently small and light. It isn't different in the case of reflex sights. Revolution was lead again by Aimpoint, when in 2007 the company introduced miniature sight Micro T-1. Dozens of articles were written regarding that construction as it became standard to which all the other designs aspire.

Now, almost every major producer offers



Holosun HS403GL reflex sight has a mass of 121 g and dimensions of 66 x 36 x 35 mm. It is powered by a 3 V lithium CR2023 battery which is placed in a socket on the right side of the body



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HS403GL is delivered in a box with foam insert, containing the red dot sight on a high mount, an additional low mount, two torx keys, a microfiber cloth, a rubber lens cover, and an instruction manual

at least one miniature sight model. Aimpoint T-1/T-2 (with even smaller Acro P-1 announced for this year), Vortex Sparc, Bushnell TR25, Trijicon MRO, and SIG Sauer ROMEO5 are some of the popular reflex sight of similar construction. Holosun Technologies alone offers five different models.

Holosun Technologies

Holosun Technologies is a company founded in 2013 by one of the subcontractors that previously manufactured electronic components for other producers. Company headquarters are located in Walnut, California, but because of cost savings, the fabrication process takes place in China.

Holosun Technologies introduced a number of innovative systems to their products, including SolarFailsafe (introduction of solar panel to provide emergency power when the

LED-powering battery discharges), Shake Awake (the sight turns off the light dot when not moved for a preset amount of time, and returns back to preset brightness when moved), Multi Reticle System (allowing change of reticle shape, for example turning off 65 MOA diameter circle, leaving only 2 MOA central dot), and usage of green LED (marked with GR in the model's name), four times as effective as red according to the producer.

The American company has over a dozen small reflex sights in their offer, distinguished by size, purpose, reticle shape, placement of batteries, control buttons, and solar panels. Among them there are models HS403B/C/GL, HS503BU/C/CU/GU, HS507C, HS508, HS510C, HS512 and HS515CM/CU/GM. After the successes of early sight models, the company also started producing a selection of laser pointers and laser target designators.

HS403GL

Comparison should always be made with the best. That's why most descriptions and reviews use Aimpoint products as reference. It can't be denied that many aesthetic aspects of American constructions resembles those of the Swedish ones as well.

Reflex sight Parolow HS403GL is made of 6061 aluminum alloy, subjected to plasma

HOLOSUN
ALSO PRODUCES
REFLEX SIGHTS
WITH M.R.S. (MULTI
RETICLE SYSTEM)
ALLOWING SELECTION
OF TARGETING RETICLE.
AVAILABLE OPTIONS
INCLUDE: 2 MOA DOT,
2 MOA DOT IN
60 MOA

electrolytic oxidation process which offers better more durable coating than traditional anodizing. The device measures 66 mm in length (2.6 in), 36 mm in width (1.4 in), 35 mm in height (1.38 in), and weighs 121 grams (4.27 ounces).

The sight is powered with 3 V lithium battery CR2023, placed within a socket secured with a cap on the right side of the device's body. The cap unscrews counterclockwise. The battery can be replaced while sight is mounted on a rifle, which is an undeniable advantage.

Control buttons are placed on the top of the body. There are two of them, marked with plus (+) and minus (-). The device is powered on by pressing either. Pushing both of them at once turns the device off.

HOLOSUN



Reflex sight Parolow HS403GL is made of 6061 aluminum alloy, subjected to plasma electrolytic oxidation process which offers better more durable coating than traditional anodizing

CR2032 battery socket and the adjustment turrets are flat, not extending far outside of the sight's outline. Incidental damages to them are unlikely



HOLOSUN

The sight has 12 brightness modes, ten for daylight conditions, and two while operating with night vision devices.

Durability

The producer declares meeting the PN-EN 60529:2003 protection norms at level IP67. The norm defines levels of protection against solid particles and liquids. The code is composed of "IP" followed by two digits, optionally followed by one or two letters. The first digit measures protection from dust and solid bodies and has range between 0 and 6. The second digit measures protection from water.

IP67 represents highest possible level of protection from dust and moderate protection from water. On paper the device should withstand short term submersion, no longer than 30 minutes, up to one meter below surface. In practice the device should withstand strong rain but should avoid longer exposure to streams of water.

Box Contents

HS403GL reaches the customer in elegant box with foam insert. Inside you can find the red dot sight itself with a high mount, an additional low mount, two torx keys, a microfiber cloth, a rubber lens cover, and an instruction manual. It would be nice to have a small tube of thread-locking fluid.

The set should contain CR2032 battery, which powers HS403GL. Should contain, as it is listed in the manual. The distributor explained its lack from the test set, as restriction on international transportation of batteries, as the battery couldn't be included with the device itself. Initially, the device was sold in Poland without the battery, which the end user had to buy independently. Since May, the distributor purchases them in bulk and adds to the sets sold.



Well visible buttons plus (+) and minus (-) at the top of the device. They are used to turning on, off, adjusting brightness, and programming the sleep mode.

First Steps

The first step after pulling HS403GL out of the box was putting in the battery. CR2032 is placed with negative pole toward the device into the sealed battery socket on the right side of the body. Cap thread works with a slight resistance and the socket itself is flat and doesn't extend much beyond the frame. Indentation on the cap surface can be used to open it with a coin.

HS403GL dot brightness has 12 levels of intensity. Ten of them are used for aiming in the daylight, the remaining two are adapted

to firing while using night vision devices. The dot at the highest brightness setting is visible in the full sunlight. Change of brightness is achieved by pushing one of two buttons on the top of the device's body. They are rubbery and work with a noticeable click. Buttons can

be easily operated with either hand.

It's a matter of taste if the user prefers such regulation, or traditional knob at the battery cap used by Aimpoint T-1. We haven't noticed any problems with the buttons, but the knob felt more sturdy and intuitive. The speed is not without the meaning either. Buttons have to be clicked multiple times while Aimpoint's solution allows for faster brightness regulation.

The set contains two torx keys. Such screw head allows for better transfer of torque while turning. The first key is dedicated to the device's mount, the second one to clamp that

Reticle

HS403GL emits a targeting dot with 2 MOA (minutes of arc) of diameter. This means that at the distance of 100 yards (91.44 m) the dot covers 2.1 inch (53.2 mm) of the target.

After turning the sight on, time to finally look through it. Surfaces of HS403GL lenses don't diminish transparency, leaving the image is clear. Some reflex sights have tint that slightly darkness the image, requiring greater focus during firing.

The dot itself in Holosun Technologies sight is ideal. Perception of reticle markings is

The red dot sight has twelve brightness levels for the 2 MOA dot shaped reticle: 10 for daylight conditions, and two for night vision operation



largely dependent on the individual user. In my case, dots of Aimpoint T-2 and Holosun HS403GL remain dots, while in case of Vortex Sparc II and Sparc AR they get slightly blurred. Thankfully not so much as to hinder my aim. Perception of dots is very individual trait, it's good to check the sights prior to purchase.

Mounting

Changing HS403GL mount is done by removing the screws at the bottom side of the sight with the smaller torx key. There are two mounts in the set, high and low. Screw placement is consistent with the standard introduced by Aimpoint T-1. This ensures compatibility with similar mounts from other producers.

Mounts are adapted for installation on a

universal rail interface (Picatinny/MIL-STD-1913) or newer NAR (NATO Accessory Rail, defined by STANAG 4694). They are mounted on the rail with a screw-tightened clamp that uses the bigger torx key included in the set.

After picking the location for the sight, I suggest placing small amount of thread-locking liquid on the screw. The next step is placing HS403GL on the rail and tightening the screw. Remember to push it as far forward as possible within the selected indentation of the rail. This will reduce chance of losing the adjustments.

Dot And The Adjustment

Time for zeroing the sights. It can be adjusted within range of 50 MOA (100 clicks). Clockwise turn moves the reticle right or up,

2 MOA dot allows for precise aiming while being big enough for the shooter to notice it immediately after entering the right position



depending upon knob used. Knobs clicks are felt and heard easily, with each click moving the dot by 0.5 MOA.

After removal of low-profile caps, the user gains access to adjustment turrets. The right one is responsible for horizontal position, the top one moved the dot along the vertical axis. The caps themselves have the right shape to help turn the turrets during their adjustment.

It's important to note that the turrets themselves are unlabeled, without information which direction they have to be turned. Instead, the producer placed hints inside the caps, arrows with letters R (Right) and U (Up), informing of the reticle movement. This solution only works when the original

caps are present. The turrets can be turned with screwdriver, small coin, or cartridge rim.

Using Frank Proctor's targeting system I managed to adjust the sights in a few shots.

CR2032 For 5 Years

One of the greatest perks of Holosun HS-403GL red dot sight is the battery longevity. According to the producer, power consumption while the diode is on is limited to a few micro-amperes. Because of that, the lithium CR2032 battery is supposed to work for 50 thousand hours of continuous work at the standard, seventh level of reticle's brightness. Obviously I was unable to verify that claim because I would have to test the sight for five years. Anyway it isn't something exceptional for red dot sights. Similar longevity is claimed by Aimpoint.

Shake Awake

Holosun Technologies introduced in their reflex sights solution that is not present in

High
m o u n t
provided together
with Holosun HS403GL
sight provides lower 1/3
co-witness. This means
that any mechanical
sights installed on
the weapon should
be visible in
the lower



HS403GL mounts are installed on interface rail via a clamp that is tightened with torx screw. People often replacing their sights can get suitable QD mounts



Holosun HS403GL sight was tested primarily on Kraków-built 5.56-mm rifle Gunshelp GH-15. The sight survived 2000 shots

Swedish constructions. I am speaking about Shake Awake system, which puts the sight into a sleep mode after preset amount of time, with default being 8 hours. Part of Shake Awake system is an accelerometer which wakes up the device with a move. Light shake is enough for HS403GL to return to the reticle brightness level it had before going dormant.

Time before entering sleep mode can be set between 0 and 12 hours. To do so, you need to push and hold plus (+) button for 3 seconds. The light dot will blink multiple times, with number of pulses representing

the current value of delay before sleeping in hours (it should blink 8 times with standard setting). At this moment pressing plus (+) or minus (-) buttons will increase or decrease the delay. Each click will adjust the delay by 1 hour and will be confirmed with the dot blinking once. After the desired delay is set, the plus (+) button has to be pressed and held for 3 seconds to confirm it. Setting the delay to 0 turns off Shake Awake mode, keeping the sight active until turned off.

Is the Shake Awake function indispensable? I can't decide. I would replace battery every 2 to 3 years anyway. Additional electronic

part is another element susceptible to damage, though it haven't failed for now.

It has to be noted that even after the full turn off by pressing both buttons, HS403GL sight will remember the last brightness setting when turned on again.

Shooting

During the test of Holosun Technologies red dot sight I shoot around 2 thousands of .223 Remington GGG bullets. Most of the time I fired GH15 rifle with 10.5 inch/267-mm barrel, based on AR-15 platform. Additionally, we tested HS403GL sight mounted on Grot S16 FB-M1. We haven't noticed any misalignment of the targeting dot and the sight never turned off on its own.

HS403GL sight cooperation with EOTech G33 magnifier went smoothly and allowed

for increased accuracy. Thanks to small size and low-profile caps on adjustment turrets and battery socket, the red dot sight did not restrict the field of vision. Aiming was quick and intuitive. Without parallax effects shooting only required placing the dot over the target and pulling the trigger.

Exploitation

I am not one of the people who value aesthetics above all else and demand their weapon to look like new all the time. I am forgiving about occasional scratches that appeared on the body of the tested sight and consider them normal signs of use.

It's worth noting that even in the conditions of low light and high reticle brightness we weren't able to notice the glow of the reflected dot on the front lens when looking from

The sight was also tested on Grot S16 FB-M1 rifle. High mount allows for use with mechanical elements visible in lower 1/3 of the lens





Tilted frontal lens prevents light reflexes. Image in the sight itself remains clear

the front mere four meters away. While it is of little importance for a civilian user, it gives a taste of tactical professionalism. Holosun beat competition here – red dot sights of other companies gave glow noticeable from more than a dozen of meters.

Ignoring slight surface abrasions, installation and removal of the sight while switching

guns had no impact on the screws. Torx indents weren't damaged in any way. If you want to keep the sight mounted on a single gun, use a bit of thread-locking liquid and screw it tightly. If you want to switch optics often, getting a QD mount would be good. Thankfully, Aimpoint T-1 standard mounts fit Holosun HS403GL.

I am worried about longevity of rubber lens cover. They are almost identical with those used by Aimpoint T-1, and similarly don't build my confidence. Their construction makes them easy to lose but for now, they play their role. Instead of putting them into pocket or hiding inside the bag, I'd rather leave them below the sights to reduce risk of losing them.

Cheap, Good, And Fast?

Holosun Technologies Paralow HS403GL sight is relatively cheap. SpecShop offers that model for 250 EUR. The sight is usually in stock, and the set contains everything needed to mount the device on any weapon with NAR/Picatinny rail

HS403GL is characterized by high brightness, comfort of use, memorizing intensity adjustments, and interesting sleep mode. I am confidently recommending this reflex sight for sport, entertainment, and training



Rubber lens cover are connected to each other and are all around unexceptional. It's the best to keep them on the sight's base. They don't interfere with firing while being kept safe



HS403GL was not spared during the tests. It is covered with scratches and abrasions. None of the incidents affected its operation, nor was there any loss of adjustments

purposes. Would I take it for war? Well, my positive impressions of this sight aren't enough to overcome reputation of Aimpoint models and IP67 protection isn't enough to recommend HS403GL for active combat duty.

Personally, I am not going for a war and will keep using this red dot sight on my weapon. I am very content with its utility. It has excellent ratio of quality to price and its construction is well though and well polished.

Battery longevity, Shake Awake system, clear lens, and two mounts are additional reasons to select this reflex sight.



📷 KAROL SZCZĘŚNIAK
📺 KAROL SZCZĘŚNIAK
JOACHIM RAŻNY
JAKUB LINK-LENCZOWSKI



The reflex sight's tiny size leave a lot of space for magnifier and additional folded iron sights

2010
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LONG ^ SHOT





XI INTERNATIONAL LONG RANGE SHOOTING COMPETITION

Longshot 2018 competition took place from April 27 to April 29, 2018, at the firing range of Wędrzyn Land Forces Training Center. Long distance European Championship – as they are called unofficially among the participants – became prestigious competition that one should attend. Like in the previous years, Longshot attracted a significant number of participants. For three days over 500 civilian and military shooters from Poland and abroad competed at the Wędrzyn firing range.

Eleventh Time

Longshot 2018 is an eleventh edition of long range shooting competition organized by Sport Club Gwardia 1924, in cooperation with Shooting Training Center Delta, General Command Of The Armed Forces, and 17th Greater Poland Mechanized Brigade. Since its beginnings, the primary goal of the event has been promotion of long range shooting, experience exchange, and integration of sport and uniformed shooter communities.

This year Longshot was divided into two parts. First one was dedicated to uniformed shooters took place on April 25–26, and the second, civilian one, followed from April 27 to April 29. Those were separate events sharing opening and closing ceremonies, giving them independent, elevated tone.

Organization

Like every year, registration for the competition was electronic, though this year introduced integration of registration and internet payment methods. Each registrant immediately after paying the fee was redirected to page where he could select preferred position and shift. Like in the last year, classification was both individual and by team. Teams were composed of two shooters. Team ratings were based on the total score of both members within single weapon category.

Gear Categories And Weapons

In the military competition, the participants shoot weapons using centerfire cartridges with

Over the years, Longshot earned prestigious status, which is reflected by number of local and international sponsors, such as Helikon-Tex, Mactronic, SpecShop, Delta Optical, Malik & Malik, Castellior, and Shmidt & Bender.





Over five hundred military and civilian shooters participated in this year's Longshot competitions in Wędrzyn



.222 to .500 (5.64-12.7 mm) calibers, divided into Tactical Standard, Tactical Magnum, and Tactical Super Magnum categories.

Civilian side of the show was divided into two main competitions: Modern using current constructions and History for older weapons. Shooters taking part in the former had a choice of centerfire weapon calibers between .222 and .458 (5.64-11.6 mm). They were divided into two categories: Tactical (further split into Standard, Standard Semi-Auto, Magnum, and Super Magnum subcategories) and Open, inclusive for all firearms within the allowed caliber range.

Fans of historical weapons could select between Historical Rifle Open and Historical Rifle Military categories. The former category was composed of centerfire weapons with caliber between .222 and .458, produced before 1950. Modern replicas of such weapons were not

This year competition included two teams composed of veteran NCOs of Polish Armed Forces and French Foreign Legion: Stratpoints Shooting Team, whose members suffered injuries during active service. They participated in Open and Standard Semi-Auto categories.



Longshot competitions are occasion to admire wide array of fine long arms in various configurations, including both repeating and self-loading.

allowed, and the competitors were restricted to using historically accurate mechanical sights. Historical Rifle Military category used military rifles within the same caliber range, built before 1950. Additionally, the weapon had to match historical configuration used by armed forces of any country that utilized particular weapon.

Thursday

I came to the event location on Thursday afternoon, April 26. At the time of my arrival pre-match warm up was taking place, which included judges and technical staff. Registration started at 1600 in a large military tent, where each of the participants

Shooters with sentiment for twenty century guns had chance to prove their skills in History rifle categories, requiring weapons at least 68 years old.





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RANGE



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Every year hundreds of shooters come from across the continent. It's not surprising that the Polish competitions are unofficially called long distance Europe championships.

received an identifier and a T-shirt, and was followed by weapon examination, checking up if all the rifles meet the requirements for their category. Checked weapons were marked with a sticker. The weather was unimpressive on that day, with rain, wind, and even some hail. Thankfully, prognosis for further days was cautiously optimistic.

Friday

On the next day, registration and weapon check up for newly arrived participants started at 0830. That day is traditionally the day of training, when all the competitors can test their gear and make all the necessary adjustments.

Majority of the test shootings was done at the ranges of incoming Saturday triathlon (300, 600, and 800 m – 328, 656, and 874 yards) in the order set up during electronic registration. The exception was made for competitors in the Super Magnum category, who were taken by a bus to “Pas Taktyczny Trzemeszno” shooting range, where they could perform test shooting at the ranges of 1000, 1200, and extreme 1500 m (1096, 1312, and 1640y). The day was sunny with temperatures in range of 11–15 degree Celsius (50–60 degree Fahrenheit), humidity of 60%, and atmospheric pressure around 1003 hPa. Cloud cover was sparse and the wind had speed of 2–4 m/s.

After the training day, it could be noticed that this year Longshot is a well organized event.

Longshot is a competition where participant make no test shots. Any necessary adjustments of weapon and sights can be performed on preceding training day.



Changes at firing positions were smooth and target replacement immediate. For the first time, the shooters were shown their target shields immediately after change. In the previous years they were only shown notes with the approximate spread marked manually, in a very inefficient and controversial solution.

Saturday

On April 28, at 0800 registration and weapon control opened again. Half an hour later, official opening of the event was conducted by colonel Robert Kosowski, commander of the 17th Mechanized Brigade. Commencement included military and civilian participants, who were greeted by main organizer Zbigniew Świerczek (who was also primary judge) and Adam Morawski (delegate of Polish Sport Shooting Federation). Competitors rejoiced as Saturday happened to be a beautiful sunny day with temperature around 15–20 degree Celsius (60–70 degree Fahrenheit), humidity of 40%, 1010 hPa of pressure, and wind speed of 2–5 m/s.

First shoots were fired at 0900. During the first shift, firing at 300 meter distance, a mirage effect could be observed, remaining a constant hindrance that day. The wind wasn't strong, comparing with the previous competitions, but it switched it's direction between right and left often, making corrections difficult.

Despite separation into military and civilian parts, opening and closing ceremonies are shared. This year opening was lead by colonel Robert Kosowski, commander of 17th Greater Poland Mechanized Brigade

This year Longshot was particularly sunny, creating certain hindrances for the shooters. One of them was strong mirage effect, making it hard to discern which targets are tied to which shooting positions.





This year introduced new way of informing shooters about their results. Instead of cards marked with shot spread, the target shields were brought for ranking in the participants presence.

During the Longshot competition triathlon takes place at increased distances. First, all the competitors shoot at the 300 meter distance, then switch to 600 meters, and finally 800 meters. This order means each of the participants comes to his position three times and fires them in varying conditions. If

As the Longshot competition was taking place at the military proving grounds, the military safety regulations were in effect. Their contents were provided to all the participants in Polish or English.





Free time between shifts can be spent on numerous stands offering a wide array of weapons, optics, and accessories.

In the closing ceremony participated general Jarosław Mika, head of General Command Of The Armed Forces. Afterwards, the wining individual and team competitors were handed their awards.

each participant fired from all three distances during single shift, it might lead to a shooter at the morning shift having vastly different weather conditions from the one firing in the afternoon. The method actually used helps equalize chances for the competitors.





Po zakończeniu zawodów odbyło się losowanie cennych nagród

Sunny weather slowly increased temperature as the time passed. Already mentioned mirage effect grew along, making aiming harder at greater distances but helping read wind changes. Smooth organization is worth additional mention. The changes were perfectly timed, the staff brought the target shields to the tents where judges scored them in the presence of

the participant. Ranking tables were updated constantly, both physically on site, and on the website. The shooting ended around 1800.

Sunday

April 29 was the day when additional round 1000+ takes place, with targets set at ranges

The weather conditions were stable, the temperature stayed in range of 10–20°C, wind was also manageable around 2-5 m/s. Shooters were spared precipitation.



exceeding one kilometer. This year it was exactly 1105 meters (1208 yards). The day was warmer than the previous one, creating even stronger mirage flowing with the wind. At times it prevented reading markings of the position linked to the target.

I shoot a rifle using .308 Winchester/7,62 mm x 51 cartridge, whose bullet slows below speed of sound at such distance. I managed to score 1 point, giving me 23rd place among 70 participants in my class. In those conditions and such ammo, I deem hitting the target a success in itself. That day I ended with more clear target shields than punctured ones.

1000+ round ended around noon. After a short pause, the official Longshot 2018 ending ceremony took place, attended by general Jarosław Mika, head of General Command Of The Armed Forces. After his address, winners in all categories were honored. First, the awards won in the military competitions were granted, followed by the civilian victors, both solo and team.

The awards were followed by another emotional event, a raffle, which thanks to sponsor included really worthwhile rewards, such as

Schmidt & Bender PM II 5-25 scope provided by Janczewski Olsztyn company and two Nightforce Competition sights sponsored by Hubertus Pro Hunting. We would like thank the sponsors again in the name of all the participants.

Longshot 2018 participation was an occasion to compete with others, but also occasion to spent time with other people sharing the passion for long range shooting. Time for exchange of experience, time to get new acquaintances, including international ones. There is a significant chance for those who took part in this competition once, that they will keep coming back regularly – this is the largest long distance shooting event in this part of Europe. 🇵🇱



📧 📷 BARTOSZ ŁUCZAK

Winners in category Tactical Standard Military



INDIVIDUAL

Tactical Standard (Triathlon 300, 600 i 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Maciej Wysokiński	Świt Starachowice	245 (3X)
2.	Adam Sztybór	KS KVG	245 (1X)
3.	Piotr Siezieniewski	Tarcza Starogard Gdański	244 (1X)

Tactical Standard Semi-Auto (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Krzysztof Wojczys	KS CWS Słupsk	238 (1X)
2.	Rafał Walczowski	TS Wiśła	233 (1X)
3.	Andrzej Piątek	STS Szczecin	229 (1X)

Tactical Magnum (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Stefan Krobath	Besser-Schiessen	279 (4X)
2.	Andres Käär	LRSC Estonia	263 (4X)
3.	Maciej Krawczak	WKS Poligon Drawski	260 (3X)

Open (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Cristian Popescu	Complexul Sportiv Anatolie Salceanu	260 (2X)
2.	Aleš Chudoba	Zbraně Liberec	259 (2X)
3.	Tomasz Kardziejonek	KS Elita	258 (3X)

Tactical Super Magnum (Triathlon 1000, 1200, 1500 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Stanisław Rowiński	BDS	62,5 (0X)
2.	Daniel Lang	BDMP Germany	57,5 (0X)
3.	Josef Linner	Drall - Austrian Competition Team	46,5 (0X)

History Military Rifle (Triathlon 100, 200, 300 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Ivo Zimani	NSA-SK	263 (4X)
2.	Zbigniew Hliwa	ZKS Warszawa	252 (2X)
3.	Arnold Przepiórkowski	Cel Kędzierzyn-Koźle	245 (4X)

History Rifle Open (Triathlon 100, 200, 300 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Łukasz Marmuszewski	Agat	277 (7X)
2.	Sebastian Kostecki	Agat Złotoryja	275 (10X)
3.	Marian Foltyn	KVZ Malacky	254 (3X)

TEAMS

Tactical Standard (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Piotr Siezieniewski, Maciej Wysokinski	Jubilex	489 (4X)
2.	Marcin Kowalski, Marek Papros	Incorsa Lapua Team	458 (6X)
3.	Paweł Klecha, Aleksander Borkowski	Mesko Cassull 2	453 (3X)

Tactical Standard Semi-Auto (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Rafał Walczkowski, Igor Stefanowski	Best Hunters	432 (1X)
2.	Andrzej Piątak, Dariusz Paliborek	Team99 PP	417 (4X)
3.	Damian Bochyński, Anna Lubryczyńska-Bochyńska	Best Hunters Team	411 (2X)

Tactical Standard Semi-Auto (Triathlon 300, 600, 800 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Piotr Lalik, Piotr Onych	Helikon-Tex Sniper Team	487 (5X)
2.	Arkadiusz Pietruszka, Piotr Narloch	Team TRG	477 (3X)
3.	Andrzej Piątak, Dariusz Paliborek	Team99 PP	474 (2X)

Tactical Super Magnum (Triathlon 1000, 1200, 1500 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Marek Bąkowski, Zbigniew Hliwa	Team99 Grupa 33	487 (6X)
2.	Valerijs Bulavčiks, Janis Saulitis	LV 13	463 (4X)
3.	Aivars Bundzens, Andrejs Vasiljevs	LVBR Club	459 (8X)

Tactical Super Magnum (Trójbój 1000, 1200, 1500 m)

RANK	PARTICIPANT	CLUB	SCORE
1.	Tarek Graf, Daniel Lang	Team99 Grupa 33	487 (6X)
2.	Daniel Dyck, Stanisław Rowiński	LV 13	463 (4X)
3.	Jerzy Ejsmont, Anna Cywińska-Ejsmont	LVBR Club	459 (8X)

ROUND 1000+

Tactical Standard

RANK	PARTICIPANT	CLUB	SCORE
1.	Marek Prapos	Legia Warszawa	65 (3X)
2.	Vilmos Eredics	Klapka Shooting Team	45 (1X)
3.	Krzysztof Zadura	PSKBPIS Płońsk	43 (1X)

Tactical Standard Semi-Auto

RANK	PARTICIPANT	CLUB	SCORE
1.	Damian Bochyński	Legia Warszawa	52 (0X)
2.	Dariusz Paliborek	AZS Politechnika Świętokrzyska	29 (0X)
3.	Andrzej Bąk	Varmint Szczecin	19 (0X)

Tactical Magnum

RANK	PARTICIPANT	CLUB	SCORE
1.	Rihards Neploho	LV BR&Varmint Club	57 (1X)
2.	Vladimir Luite	LRSC Estonia	55 (1X)
3.	Raul Elstrok	LRSC Estonia	52 (0X)

Open

RANK	PARTICIPANT	CLUB	SCORE
1.	Aivars Bundzens	Br&Varmint Club	72 (0X)
2.	Piotr Borysewicz	KS UR Jawor	49 (1X)
3.	Leo Pools	SV Langedijk	48 (0X)



Winners in category Tactical Standard Semi-Auto

INDIVIDUAL (MILITARY)

Tactical Standard (Military) (Triathlon 300, 600, 800 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Emanuel Dąbrowski	JW1248	204 (1X)
2.	Piotr Osiński	JW1248	193 (0X)
3.	Marcin Neckar	JW5700	192 (0X)

Tactical Magnum (Military) (Triathlon 300, 600, 800 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Richard Brown	QDG	142 (1X)
2.	Thomas Warner	QDG	141 (1X)
3.	Robert Koptyra	JW2399	20 (0X)

Tactical Super Magnum (Military) (Triathlon 1000, 1200, 1500 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Paweł Srębowaty	JW2908	37,00 (0X)
2.	Damian Radecki	JW3797	36,00 (0X)
3.	Patryk Krzykawski	JW2399	25,25 (0X)

TEAMS (MILITARY)

Tactical Standard (Military) (Triathlon 300, 600, 800 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Emanuel Dąbrowski, Piotr Osiński	16BZ2	397 (1X)
2.	Paweł Silewicz, Krzysztof Wójcik	DRSW 02	327 (2X)
3.	Piotr Łopuszyński, Przemysław Ślepko	1BPanc 3BZ	318 (0X)

Tactical Super Magnum (Military) (Triathlon 1000, 1200, 1500 M)

RANK	PARTICIPANT	CLUB	SCORE
1.	Tomasz Wysocki, Damian Radecki	2 BZ	43,8 (0X)
2.	Marceli Góralski, Jan Kędra	DRSW 03	34,3 (0X)
3.	Maciej Mazurek, Karol Kostrzewa	Sekcja 1	24,0 (0X)

TEST

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PATROL CHARGER +



PATROL

S/N 1311 0005

1000-200



A flashlight is a versatile tool used practically by everyone. We have multiple ones in our homes: starting with miniature ones attached to keys, through those fitting lady's handbag, those attached to pistols and rifles, to the big spotlights used to dazzle alien invaders. In addition to flashlights attached to weapons, touristic, and those used while waiting for end of power outage, there is another category of flashlights. Those are work tools, used by people working at night. One of those is a facility patrol flashlight Mactronic Patrol Charger+, charged through a docking station.

Facility patrol flashlight

Usually, during an unexpected power outage at night, we discover two universal truths regarding our flashlight. The first truth is that the flashlight isn't in place where it was supposed to be. The second is that when finally found, it won't have enough juice to last through the outage. Basically, the only way to avoid those user-faulted issues is using a charging dock. This is a common solution for facility flashlights, one of which is Mactronic **Patrol Charger+**. Not only the docking station should stay in the same place, but also the flashlight itself almost certainly will be fully charged. Assuming anyone did connect it properly to power source, of course.

Facility Flashlight

Facility patrol flashlight are typically quite versatile. On one hand, they are small enough to be comfortably carried in a belt holster or a side pocket. On the other hand, they provide more light than typical pocket models. They are suitable for patrolling, searching, and signalization.

Charging dock can be installed in a building or a car – powered with either AC or DC as needed. Its functionality helps solve problems mentioned above. As long as the user will remember to connect the flashlight into the dock, it will be charged and ready to use. While facility flashlights are generally intended for uniformed services, they are universal enough to serve as emergency light source for a house or large flashlight during a touristic trip.

Patrol Charger+

Patrol flashlight Mactronic **Patrol Charger+** (producers code THH0052) belongs to Tactical family. It is made by company specializing in production and distribution of light sources intended for uniformed services and civilian purposes.

Patrol Charger+ uses Cree XP-L diode as a light source, having a maximum brightness of 700 lumens. It is covered with a scratch and break

resistant lens made out of Lexan polycarbonate. The device is powered by a Li-Ion battery with the capacity of 3350 mAh. The flashlight's length is 185 mm (7.28 in.), with the diameter of 47 mm (1.85 in.) in the widest point, and 31 mm (1.22 in.) in the narrow part. The device weights 230 grams (0.507 lb.).

Beyond the flashlight, the set also contains a charging dock, a mounting plate, a charger for spare battery, a battery, wrist loop, and two power supplies, a 230 V AC with Polish plug, and a 12/24 V DC with plug fitting car lighter socket.

Facility patrol flashlight **Patrol Charger+** design is solid and thought through, confirmed multiple times during the tests





The head with smaller button below. **Patrol Charger+** has four modes of work: 100%, 50%, 10% i strobescope. Power is switched with a single button click

At first glance, **Patrol Charger+** gives a solid impression, and further experience confirms it. The chassis is made of aluminum alloy, with rubber-covered anti-slip grip. The ring around the head is shaped in a way that prevents the flashlight from rolling away when put down. Below the head docking elements are placed, composed of double corrugated ring that holds the flashlight in the charger, with two exposed contacts. All the parts are well fit, with the threads of the head and the cap leaving no unnecessary leeway. The same applies to knurling on those parts, providing for better grip while unscrewing them. Tightness is ensured by o-ring rubber gaskets, giving the flashlight water and dust resistance at IP68 level.

The flashlight has a laser-etched Mactronic logo, with a name PATROL printed on its body. Below the power button, a unique serial number is listed (tested model was S/N 1311 0005I). Another designation was placed inside the cap (RDC-002198283-0005).

Modes Of Operation

Flashlight has two control button (adorned with the producer's logo), with the same functions. The first, smaller button, is placed directly below the head and can be operated with a thumb. The bigger second button lies on the end cap of the flashlight and works well with the reverse grip. The buttons work well even with thick gloves.

Patrol Charger+ has four modes of work: 100%, 50%, 10%, and strobe light. Light brightness is regulated via single clicks of the button, while holding it turns on the strobe. The flashlight can't be programmed, always switching on at the full power. Turning off the flashlight requires cycling through all the modes.

According to the producer, **Patrol Charger+** can work 2.5 hour in 100% mode, 5 hours in 50% mode, 25 hours in 10% mode, and 6 hours in strobe light mode.

Charging Dock

The docking station that is part of the set, is made of plastic. **Patrol Charger+** is held in position with spring-loaded latches, fitted to the crimped rings on the flashlight. Protruding contacts deliver the charging current. The station itself is installed in the desired place with separate mounting plate. The dock can be moved around without unscrewing the plate thanks to an easy to operate latch.

A secondary charger can be mounted to the side of the main charger, allowing the user to charge a spare battery. Power sockets are placed at the bottom. The device is equipped with micro USB socket in addition to regular power grid and car lighter sockets. The tested unit was quipped with multiple diodes signaling proper placing of the flashlight, charging status, as well as white LED acting as an emergency lightning. The later turn on automatically during external power outage using the flashlight's battery. That function can be turned off with a button placed at the top of the docking station.

The producer lists full charging time of a discharged flashlight as 4 to 6 hours at 240 V AC, with two batteries taking between 6 to 10 hours.



Charging dock installed in a car compartment. White diodes signalize lack of external power source and help find the flashlight. The set is small enough that the compartment remains

Second button, similarly adorned with Mactronic logo is on the bottom





The station installed at home underneath the countertop. Lit up dock works finely during the power outage

Power Outages

Patrol Charger+ flashlight was tested for over three months. In the beginning, it fulfilled the role of emergency light source in a household. The charging dock was installed underneath countertop of a kitchen island, next to the extinguisher, and the first aid kit.

Additional LED diodes of the charging dock were turned on, and the flashlight spent most of the time plugged in. Power outage occurred soon enough. Immediately after the power went down, the diodes started to glow. They were bright enough to find and safely reach the flashlight without dazzling. Patrol Charger+ was fully charged, and due to flat bottom could stand on a table as an emergency lamp. In the 10% mode, the light was sufficient to wait comfortably for the power to return. The only thing missing was external diffuser but the producer doesn't offer any.

Flashlight At Home

The flashlight worked without issues. Brightness modes are finely chosen for such application. Full power allows for checking the surroundings of home and a modestly sized parcel. The producer declares useful range of 250 meters. We haven't checked it at such long distance, but it had no problems illuminating objects at up to 150 meters. The flashlight head heated quite quickly, but it's not surprising at such power level. 50% mode worked fine during the normal use: checking fuse box, scrounging through pantry, and night walks. 10% mode was used as an emergency lighting to wait through power outage comfortably.

Contact With Station

A few hours later, after the power was restored, the flashlight returned to its place. This is when a small problem appeared. On paper, placing the flashlight in the docking station is not hard. You



Docking station and battery charger can be used separately. Each has two power sockets, traditional and micro USB

The flashlight can be carried strapped to leg bag

have to put it between latches, turn and move until the charging diode lights signaling the Patrol Charger was placed in correct position. In reality, the process was frustrating and time consuming, especially in the upside down position (the dock was mounted underneath the countertop). Initial judgment: lack of practice, next time will be better. Indeed, with time the process became smoother, but the issue remained. Placing **Patrol Charger+** back in its charging dock was irritating each time. Contact position between the flashlight and the dock is so minimal, that finding it takes annoyingly long seconds.

In Car

In the second stage of tests, the flashlight was moved to off-road car, as a part of its outfit. The



car was used on a daily basis in a wide array of arboriculture operations. The car also serves as local rescuer for stuck off-road cars. Mounting of the docking station was uneventful. Power was connected to backside lighter socket. The cable provided was long enough to place the station beneath passenger's compartment.

Regretfully, at higher speeds over uneven ground the flashlight often fell out of the dock. Vibrations generated by faster drives slowly

loosened **Patrol Charger+**. After going over a bigger hole or a bigger rock, the clamps were surrendering to the gravity. Even when the flashlight stayed in its place, it often lost charging when the contacts moved a little bit out of their proper alignment.

The issue with the flashlight falling out was solved by moving the docking station to the side of center console. After this step, **Patrol Charger+** stayed correctly in its place. Sadly, the random issues with charging still happened, though not as often as before.

Field Patrol

Despite those issues, **Patrol Charger+** excelled as a work flashlight in a company off-road car. On the tarmac roads the problems waned and the charging was sufficient enough to avoid power shortages. The test also confirmed ruggedness of the flashlight.

Patrol Charger+ survived multiple baths in pud-



Patrol Charger+ is resistant to harsh environmental conditions. Sealed construction protects internal parts from dirt and water

Additional battery charger is part of the set. It can be connected to the docking station forming aesthetic charging dock.



dles or mud, and falls from the car's hood on the rocks below. Once, in the fervor of pulling out a deeply stuck car, the flashlight was driven over into the muddy ground. The only noticeable effect was spontaneous switching to strobe light mode.

The rubberized anti-slip grip works perfectly. Despite wetness and mud, the flashlight laid firmly in the grasp. Its size matters too. For field duty larger and more sturdy light source is superior than typical smaller EDC constructions. Bigger flashlight is more comfortable to hold, harder to lose, and easier to find.

Flashlight In Forest

In field conditions, the flashlight worked in 50% mode most of the time. It was sufficiently strong to work with cables and winches while staying on for long time. Switching to full power of 100% mode was useful a few times, especially when determining the safest route to pull rescued car.

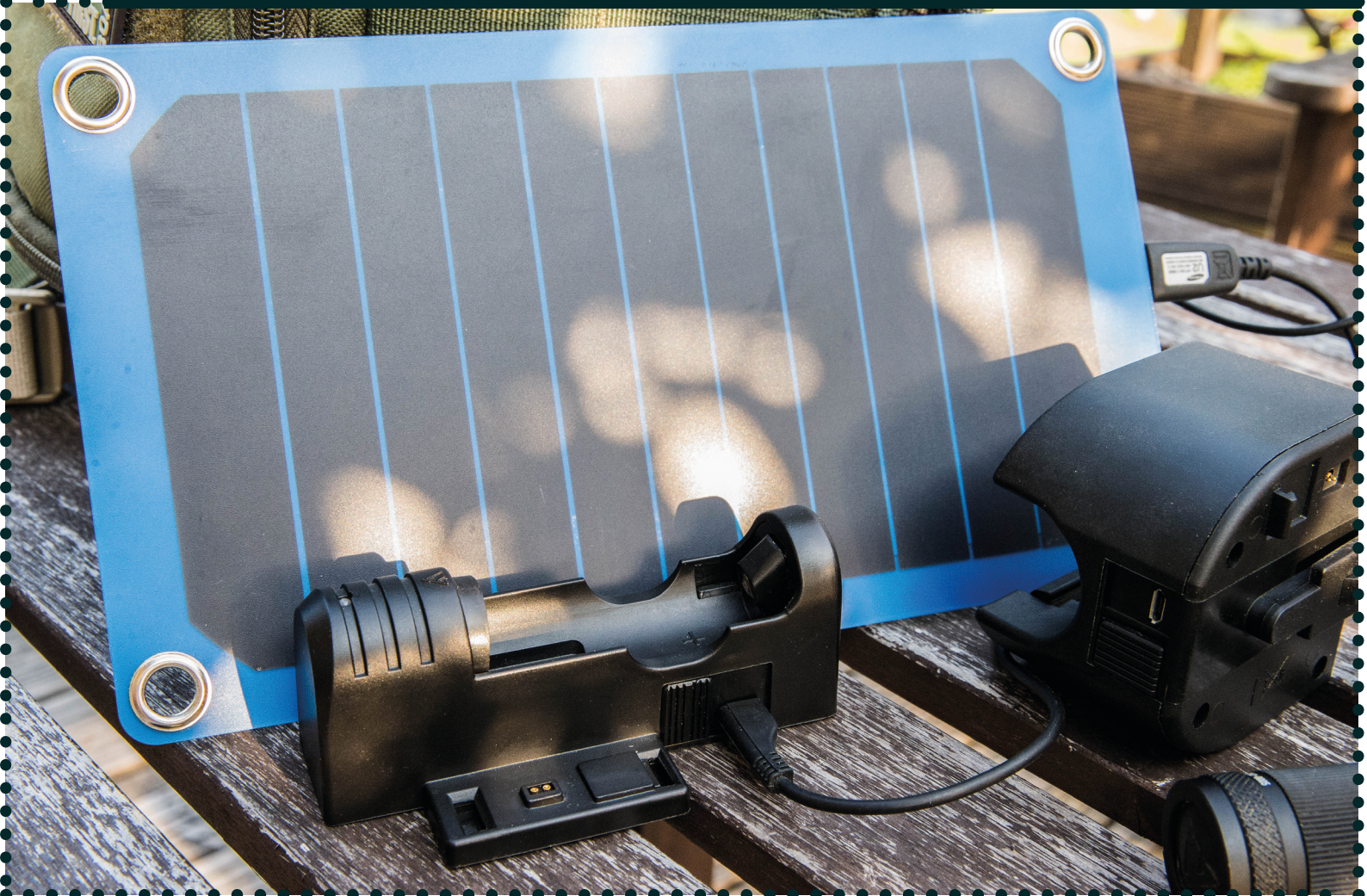
Patrol Charger+ beam is shaped in the so-called Pre-Focus. It is designed to provide focused light on a longer distance, while being dispersed enough to comfortably use the flashlight inside the car. For the later use, the lowest power setting is perfectly sufficient. Light reflected off windows and mirrors doesn't dazzles the passengers.

Here a minor flaw was revealed, however. Each time, the flashlight turns on in the 100% mode, which is too bright within the confines of a car at night. Accidental switching on causes momentary blindness. The flashlight has to be covered and the correct mode has to be set to use it comfortably

Shelters And Tunnels

The last stage of **Patrol Charger+** tests took place during two week trip to Albania. Because of numerous shelters and tunnels available for exploration, a decent flashlight can be very useful. The charging station was moved again,

Presence of an additional micro USB socket allows charging the flashlight from many sources, such as portable solar panel connected to the docking station. Charging is noticeably slower, however





Quickly latched mounting plate is suitable for installation with screws or double sided tape. In the upper part latches can be seen, on the left are contacts of the battery charger.

this time to an SUV.

Admittedly, the installation of the charger on a separate mounting plate is a smart and convenient solution. Repeated moves weren't an issue at all. After unlatching the dock, it's easy to unscrew or peel off glued plate itself.

Taught by previous experience, we installed the flashlight vertically, in the armrest compartment, to avoid tempting the curious lookers. Emergency diodes were turned off as the compartment needs little illumination. That was an error on our side, though, because vibration cause misalignment became an issue again. Additionally, placing the flashlight inside the compartment made checking the charge level troublesome.

Despite that, [Patrol Charger+](#) performed excellently during the trip. First, it voided eternal question "where is the flashlight?" Everyone knew it's in the compartment, charged and ready to use. Only once the battery was not fully charged after reaching the new place when the vibrations interrupted the process.

Temporary switch from [Patrol Charger+](#) to a smaller EDC showed how useful is strong light source when setting up the camp in the wild. It was the only use of different flashlight during that trip.

This Mactronic's product is wonderfully comfy in use. During the foot trips, [Patrol Charger+](#) was attached to leg bag or put inside thigh pocket. Weigh of 230 grams wasn't particularly noticeable while the flashlight was used multiple times while exploring abandoned tunnels or visiting poorly lit Albanian monuments. The micro USB socket was useful as well, allowing charging the flashlight directly from portable solar panel.

Always 100%

The flashlight rating would be very high if not for two mentioned flaws. They are not big enough to reject this product, but they are annoying enough you can't ignore them. Mactronic does work to improve their products so we can hope the next version of [Patrol Charger+](#) will correct them.

Inability to program mode in which it turns on is a minor flaw. It makes sense for a patrol flashlight to start in the strongest mode when used specifically for that purpose. However, when it is used as an additional light source in a car or house, it would be handy to change the initial mode to adapt to environment and needs of the user. Not always full 700 lumens is desired immediately after turning on.

Docking Station

The docking station is a bigger issue, especially that it is the most important part of the construction. Here, the problem is the way **Patrol Charger+** is inserted into the charger and the contacts between the charger and the flashlight.

It's hard to place the flashlight quickly and securely in a way that would start the charging process. Each time it required moving the device around. Inserting the **Patrol Charger+** correctly while driving is particularly problematic. The size of the contacts is too small and the sole indicator of success is the charging diode. Maybe daily use of **Patrol Charger+** would develop the right touch.

The docking station isn't holding the flashlight's

torso firmly enough. Even in vertical position, when falling out stopped being a problem, the car vibrations interrupted charging. When the docking station is visible, that's irritating. Worse, when it's placed within a compartment. You might discover on reaching your destination that the flashlight will glow for 10 minutes before dying because few hours earlier you drove over a hole. That's why I can't imagine keeping **Patrol Charger+** on quad or UTV. If not for the docking station, this would be the perfect flashlight for such use. The charging dock could use additional lock to secure **Patrol Charger+** in the station.

Rating

Patrol Charger+ is very versatile. It can be used either as a powerful patrol light source or a bigger version of EDC flashlight. It is handy and solid, and the charging station is an additional point. It works perfectly as the emergency light in a car. Equipped with an additional overlay, it can be used for signalization or traffic management.

Diodes placed on the station will be helpful

Small contacts placed opposite the power button. They are placed in corrugated rings which help place the flashlight into docking station. Sadly, they are missing clear sides that would warrant proper alignment with the charger





Mactronic **Patrol Charger+** illuminating car at the distance of 25 m, and hunting pulpit at 55 m with full power

when Patrol Charger+ is used in household or another building as emergency lighting that helps reach the flashlight faster. Easy of charging, high capacity battery, and well picked modes warrant maintenance of constant readiness.

Mactronic product is worthy of your attention and is excellent in the emergency light role for house or car. Forgetful and hurried will appreciate ease of charging with the docking station.

Strong diode and big battery will work for civilian and uniformed uses.

*We would like to express our gratitude to
Mactronic for test unit*



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