

Aircraft Systems

AEM 617/517/417

Spring 2018

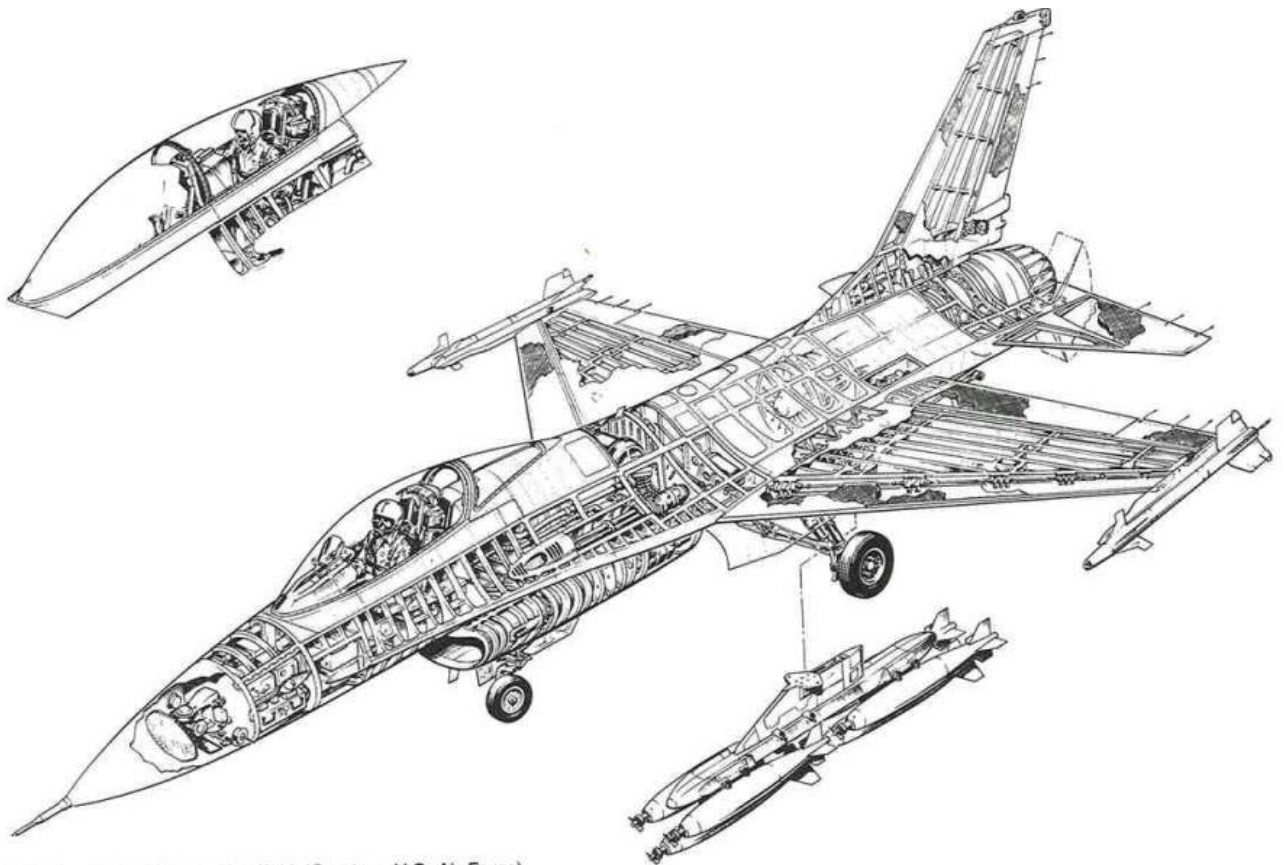


FIG. 1.1. General Dynamics F-16 (Courtesy U.S. Air Force).



Barn Owl

- Perch
- Launch
- Flapping Flight
- Catch & Eat
- Stealth (night + sound)

Warren Photographic

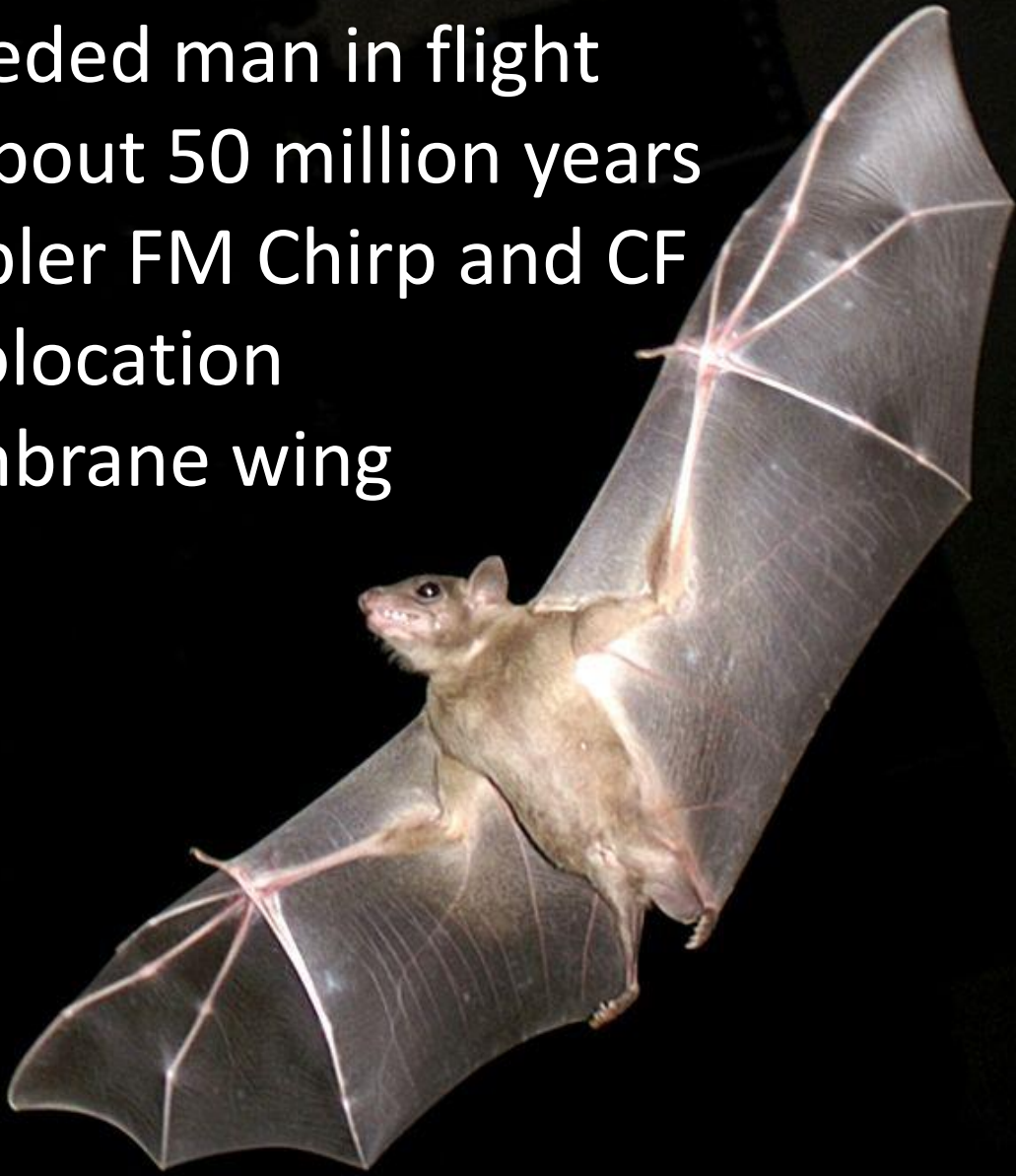


Falcon

- +242 mph dive
- +Faster than man until 1923

Bat

- Preceded man in flight by about 50 million years
- Doppler FM Chirp and CF echolocation
- Membrane wing



By Original photo: אורן פלס Oren Peles Derivative work: User:MathKnight - File:PikiWiki Israel 11327 Wildlife and Plants of Israel.JPG by אורן פלס, CC BY 2.5, <https://commons.wikimedia.org/w/index.php?curid=27775788>

Human Flight

Wright Flyer 1903



Fokker Dr I (June 1917)

Germany

Seen in its fighter context as a formula for combining good climbing qualities with extreme lateral manoeuvrability made possible by an exceedingly small overall wing span, the triplane was an aberration from the mainstream of fighter development. It was to enjoy a brief heyday in 1917 and be obsolescent before that year's end. Indeed, of many fighter triplanes developed, but two were to see combat.

Triplane investigation in Germany dated from aviation's early pioneering days, but the catalyst in its further development for the fighter role was provided by the February 1917 operational debut of the Royal Naval Air Service's Sopwith Triplane. The *Fliegertruppen* were startled by the remarkable manoeuvrability and climb rate demonstrated by the Sopwith. Germany being panicked into launching a massive single-seat fighter triplane development effort, which, with the sole exception of one type, the Fokker Dr I, was to prove an abysmal failure. The Dr I was thus conceptually unoriginal in being engendered by the Sopwith, but it nevertheless embodied some highly innovative features.

Designed by Reinhold Platz, the prototype—at that time

known as the D VI, Fokker having skill to adopt V-series designations for experimental aircraft—was an outstandingly compact triplane with verespansions (literally "without bracing") or cantilever wings dispensing with flying landing and incidence wires, the necessary strength being imparted by an original single-spar arrangement, which was actually two boxspars joined vertically. The fuselage was of welded steel tubing with transverse bracing to form a rigid box-spider structure. Wing oscillation in certain flight regimes dictated introduction of thin, non-structural spruce I-type interplane struts to provide the desired rigidity.

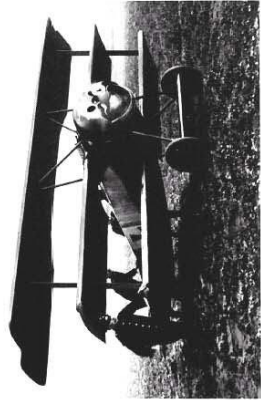
Enjoying the patronage of no less a personality than Manfred Freiherr von Richthofen, the triplane was ordered into production on 14 July 1917, two prototypes being tested at the Front in the following month by von Richthofen and Werner Voss. Production Dr I was reached the Front in October proving very sensitive about all axes and most taxing to fly. The Dr I, nevertheless, possessed superlative aerobatic qualities, and if a slow, low-altitude performer, it

made a dangerous adversary with a skilled pilot at its controls. Its manoeuvrability was arguably second to no other fighter. In developing the Dr I, however, the *Fliegertruppe* had not comprehended the inherent limitations of the triplane configuration and its early demise was inevitable, only 320 fighters of this type being built.

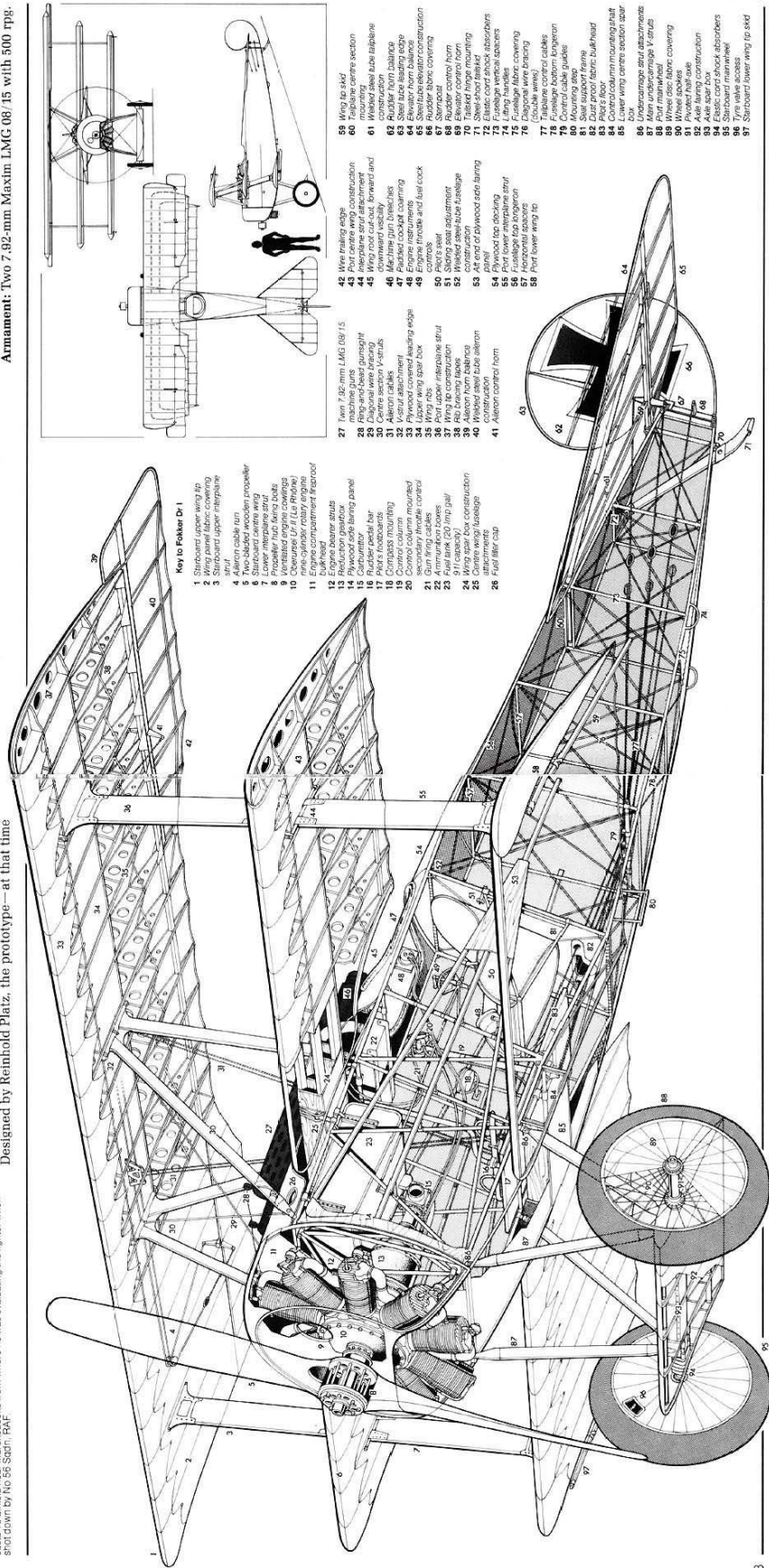
SPECIFICATION: Fokker Dr I

Power Plant: One Oberursel Ur II nine-cylinder rotary air-cooled engine rated at 110 hp at 1,200 rpm for take-off. Two-bladed fixed-pitch wooden propeller. Internal fuel capacity, 20 Imp gal (91 l).

Performance: Max speed, 115 mph (185 km/h) at sea level, 102.5 mph (165 km/h) at 13,125 ft (4,000 m), initial climb, 1,800 ft/min (9.15 m/sec); time to 3,280 ft (1,000 m), 2.9 min, to 9,840 ft (3,000 m), 10.1 min, to 16,405 ft (5,000 m), 23.85 min; range, 185 mls (300 km).
Weights: Empty, 894 lb (406 kg); loaded, 1,291 lb (586 kg).
Dimensions: Span, 23 ft 7 in (7.19 m); length, 18 ft 11 in (5.77 m); height, 9 ft 6 in (2.95 m); wing area, 200.86 sq ft.
Armament: Two 7.92-mm Maxim LMG 08/15 with 500 rpg.



Above: One of the Dr I prototypes (F 1103/17) being taxied by Werner Voss at the Front. Below: The engine from where he was evaluating the fighter when shot down by No 55 Sqn, RAF.



Key to Fokker Dr I

- 1 Standard upper wing to machine guns
- 2 Wing panel fabric covering
- 3 Standard upper interplane struts
- 4 Aileron cable run
- 5 Two-bladed wooden propeller
- 6 Lower interplane struts
- 7 Lower interplane struts
- 8 Propeller hub
- 9 Propeller hub
- 10 Oberursel Ur II engine
- 11 Engine-propeller shaft
- 12 Bulkhead
- 13 Reduction gearbox
- 14 Plywood side fairing panel
- 15 Plywood fuselage
- 16 Plywood fuselage
- 17 Plywood fuselage
- 18 Plywood fuselage
- 19 Plywood fuselage
- 20 Plywood fuselage
- 21 Gun firing cables
- 22 Ammunition boxes
- 23 Gun firing cables
- 24 Gun firing cables
- 25 Gun firing cables
- 26 Fuel filler cap

- 27 Fuel filler cap
- 28 Fuel filler cap
- 29 Fuel filler cap
- 30 Fuel filler cap
- 31 Fuel filler cap
- 32 Fuel filler cap
- 33 Fuel filler cap
- 34 Fuel filler cap
- 35 Fuel filler cap
- 36 Fuel filler cap
- 37 Fuel filler cap
- 38 Fuel filler cap
- 39 Fuel filler cap
- 40 Fuel filler cap
- 41 Fuel filler cap
- 42 Fuel filler cap
- 43 Fuel filler cap
- 44 Fuel filler cap
- 45 Fuel filler cap
- 46 Fuel filler cap
- 47 Fuel filler cap
- 48 Fuel filler cap
- 49 Fuel filler cap
- 50 Fuel filler cap
- 51 Fuel filler cap
- 52 Fuel filler cap
- 53 Fuel filler cap
- 54 Fuel filler cap
- 55 Fuel filler cap
- 56 Fuel filler cap
- 57 Fuel filler cap
- 58 Fuel filler cap
- 59 Fuel filler cap
- 60 Fuel filler cap
- 61 Fuel filler cap
- 62 Fuel filler cap
- 63 Fuel filler cap
- 64 Fuel filler cap
- 65 Fuel filler cap
- 66 Fuel filler cap
- 67 Fuel filler cap
- 68 Fuel filler cap
- 69 Fuel filler cap
- 70 Fuel filler cap
- 71 Fuel filler cap
- 72 Fuel filler cap
- 73 Fuel filler cap
- 74 Fuel filler cap
- 75 Fuel filler cap
- 76 Fuel filler cap
- 77 Fuel filler cap
- 78 Fuel filler cap
- 79 Fuel filler cap
- 80 Fuel filler cap
- 81 Fuel filler cap
- 82 Fuel filler cap
- 83 Fuel filler cap
- 84 Fuel filler cap
- 85 Fuel filler cap
- 86 Fuel filler cap
- 87 Fuel filler cap
- 88 Fuel filler cap
- 89 Fuel filler cap
- 90 Fuel filler cap
- 91 Fuel filler cap
- 92 Fuel filler cap
- 93 Fuel filler cap
- 94 Fuel filler cap
- 95 Fuel filler cap
- 96 Fuel filler cap
- 97 Fuel filler cap

GULFSTREAM G250

MEGGITT

Rockwell
Collins

MOOG

PPG Aerospace
Transparencies

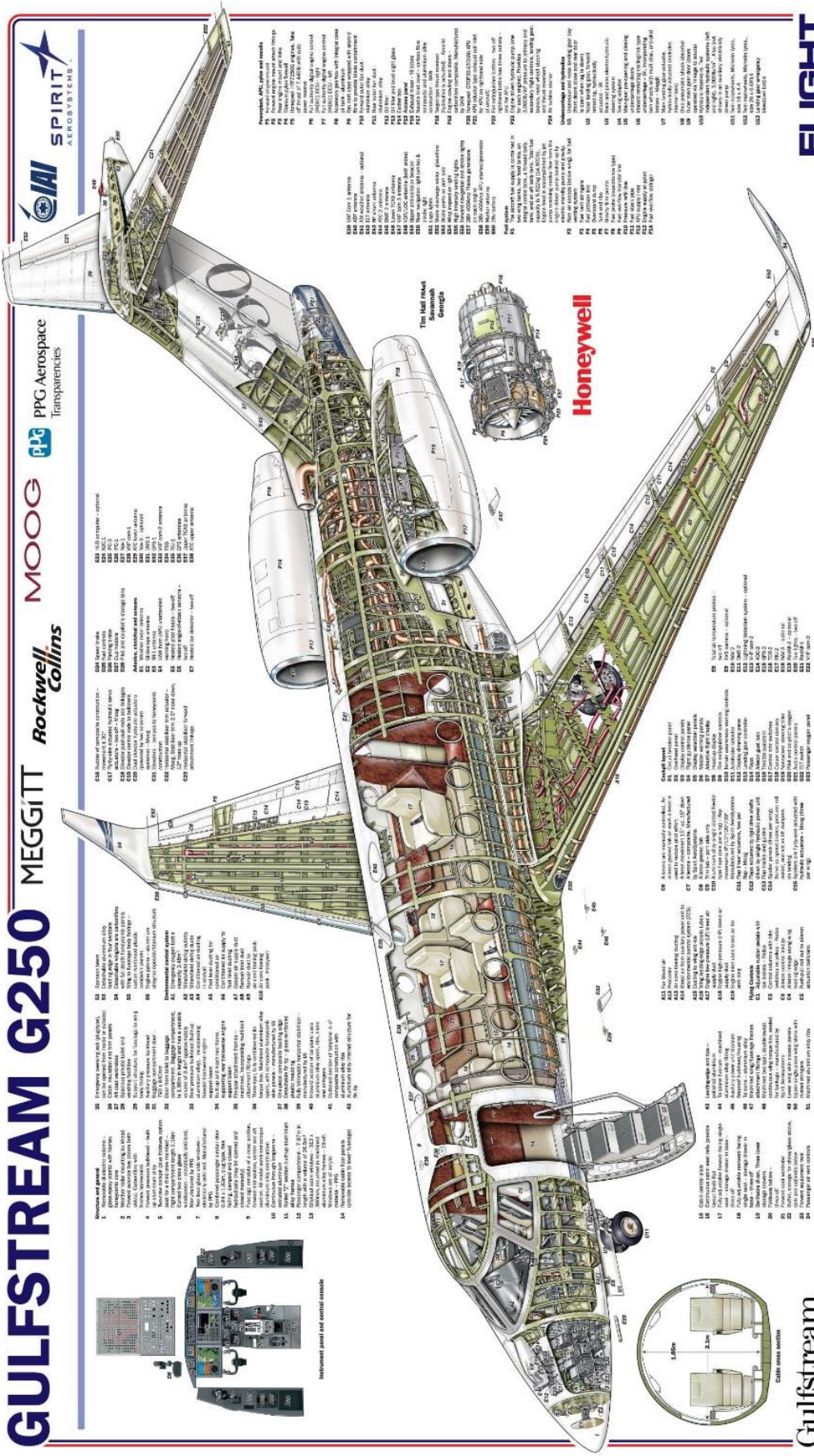
IAI

SPIRIT
AEROSYSTEMS



Instrument panel and control console

- 11 Instrument panel
- 12 Forward cabin door
- 13 Forward cabin door
- 14 Forward cabin door
- 15 Forward cabin door
- 16 Forward cabin door
- 17 Forward cabin door
- 18 Forward cabin door
- 19 Forward cabin door
- 20 Forward cabin door
- 21 Forward cabin door
- 22 Forward cabin door
- 23 Forward cabin door
- 24 Forward cabin door
- 25 Forward cabin door
- 26 Forward cabin door
- 27 Forward cabin door
- 28 Forward cabin door
- 29 Forward cabin door
- 30 Forward cabin door
- 31 Forward cabin door
- 32 Forward cabin door
- 33 Forward cabin door
- 34 Forward cabin door
- 35 Forward cabin door
- 36 Forward cabin door
- 37 Forward cabin door
- 38 Forward cabin door
- 39 Forward cabin door
- 40 Forward cabin door
- 41 Forward cabin door
- 42 Forward cabin door
- 43 Forward cabin door
- 44 Forward cabin door
- 45 Forward cabin door
- 46 Forward cabin door
- 47 Forward cabin door
- 48 Forward cabin door
- 49 Forward cabin door
- 50 Forward cabin door
- 51 Forward cabin door
- 52 Forward cabin door
- 53 Forward cabin door
- 54 Forward cabin door
- 55 Forward cabin door
- 56 Forward cabin door
- 57 Forward cabin door
- 58 Forward cabin door
- 59 Forward cabin door
- 60 Forward cabin door
- 61 Forward cabin door
- 62 Forward cabin door
- 63 Forward cabin door
- 64 Forward cabin door
- 65 Forward cabin door
- 66 Forward cabin door
- 67 Forward cabin door
- 68 Forward cabin door
- 69 Forward cabin door
- 70 Forward cabin door
- 71 Forward cabin door
- 72 Forward cabin door
- 73 Forward cabin door
- 74 Forward cabin door
- 75 Forward cabin door
- 76 Forward cabin door
- 77 Forward cabin door
- 78 Forward cabin door
- 79 Forward cabin door
- 80 Forward cabin door
- 81 Forward cabin door
- 82 Forward cabin door
- 83 Forward cabin door
- 84 Forward cabin door
- 85 Forward cabin door
- 86 Forward cabin door
- 87 Forward cabin door
- 88 Forward cabin door
- 89 Forward cabin door
- 90 Forward cabin door
- 91 Forward cabin door
- 92 Forward cabin door
- 93 Forward cabin door
- 94 Forward cabin door
- 95 Forward cabin door
- 96 Forward cabin door
- 97 Forward cabin door
- 98 Forward cabin door
- 99 Forward cabin door
- 100 Forward cabin door



- Part numbers and descriptions:
- 828 501 Core 1, engine
 - 829 502 Core 2, engine
 - 830 503 Core 3, engine
 - 831 504 Core 4, engine
 - 832 505 Core 5, engine
 - 833 506 Core 6, engine
 - 834 507 Core 7, engine
 - 835 508 Core 8, engine
 - 836 509 Core 9, engine
 - 837 510 Core 10, engine
 - 838 511 Core 11, engine
 - 839 512 Core 12, engine
 - 840 513 Core 13, engine
 - 841 514 Core 14, engine
 - 842 515 Core 15, engine
 - 843 516 Core 16, engine
 - 844 517 Core 17, engine
 - 845 518 Core 18, engine
 - 846 519 Core 19, engine
 - 847 520 Core 20, engine
 - 848 521 Core 21, engine
 - 849 522 Core 22, engine
 - 850 523 Core 23, engine
 - 851 524 Core 24, engine
 - 852 525 Core 25, engine
 - 853 526 Core 26, engine
 - 854 527 Core 27, engine
 - 855 528 Core 28, engine
 - 856 529 Core 29, engine
 - 857 530 Core 30, engine
 - 858 531 Core 31, engine
 - 859 532 Core 32, engine
 - 860 533 Core 33, engine
 - 861 534 Core 34, engine
 - 862 535 Core 35, engine
 - 863 536 Core 36, engine
 - 864 537 Core 37, engine
 - 865 538 Core 38, engine
 - 866 539 Core 39, engine
 - 867 540 Core 40, engine
 - 868 541 Core 41, engine
 - 869 542 Core 42, engine
 - 870 543 Core 43, engine
 - 871 544 Core 44, engine
 - 872 545 Core 45, engine
 - 873 546 Core 46, engine
 - 874 547 Core 47, engine
 - 875 548 Core 48, engine
 - 876 549 Core 49, engine
 - 877 550 Core 50, engine
 - 878 551 Core 51, engine
 - 879 552 Core 52, engine
 - 880 553 Core 53, engine
 - 881 554 Core 54, engine
 - 882 555 Core 55, engine
 - 883 556 Core 56, engine
 - 884 557 Core 57, engine
 - 885 558 Core 58, engine
 - 886 559 Core 59, engine
 - 887 560 Core 60, engine
 - 888 561 Core 61, engine
 - 889 562 Core 62, engine
 - 890 563 Core 63, engine
 - 891 564 Core 64, engine
 - 892 565 Core 65, engine
 - 893 566 Core 66, engine
 - 894 567 Core 67, engine
 - 895 568 Core 68, engine
 - 896 569 Core 69, engine
 - 897 570 Core 70, engine
 - 898 571 Core 71, engine
 - 899 572 Core 72, engine
 - 900 573 Core 73, engine
 - 901 574 Core 74, engine
 - 902 575 Core 75, engine
 - 903 576 Core 76, engine
 - 904 577 Core 77, engine
 - 905 578 Core 78, engine
 - 906 579 Core 79, engine
 - 907 580 Core 80, engine
 - 908 581 Core 81, engine
 - 909 582 Core 82, engine
 - 910 583 Core 83, engine
 - 911 584 Core 84, engine
 - 912 585 Core 85, engine
 - 913 586 Core 86, engine
 - 914 587 Core 87, engine
 - 915 588 Core 88, engine
 - 916 589 Core 89, engine
 - 917 590 Core 90, engine
 - 918 591 Core 91, engine
 - 919 592 Core 92, engine
 - 920 593 Core 93, engine
 - 921 594 Core 94, engine
 - 922 595 Core 95, engine
 - 923 596 Core 96, engine
 - 924 597 Core 97, engine
 - 925 598 Core 98, engine
 - 926 599 Core 99, engine
 - 927 600 Core 100, engine
 - 928 601 Core 101, engine
 - 929 602 Core 102, engine
 - 930 603 Core 103, engine
 - 931 604 Core 104, engine
 - 932 605 Core 105, engine
 - 933 606 Core 106, engine
 - 934 607 Core 107, engine
 - 935 608 Core 108, engine
 - 936 609 Core 109, engine
 - 937 610 Core 110, engine
 - 938 611 Core 111, engine
 - 939 612 Core 112, engine
 - 940 613 Core 113, engine
 - 941 614 Core 114, engine
 - 942 615 Core 115, engine
 - 943 616 Core 116, engine
 - 944 617 Core 117, engine
 - 945 618 Core 118, engine
 - 946 619 Core 119, engine
 - 947 620 Core 120, engine
 - 948 621 Core 121, engine
 - 949 622 Core 122, engine
 - 950 623 Core 123, engine
 - 951 624 Core 124, engine
 - 952 625 Core 125, engine
 - 953 626 Core 126, engine
 - 954 627 Core 127, engine
 - 955 628 Core 128, engine
 - 956 629 Core 129, engine
 - 957 630 Core 130, engine
 - 958 631 Core 131, engine
 - 959 632 Core 132, engine
 - 960 633 Core 133, engine
 - 961 634 Core 134, engine
 - 962 635 Core 135, engine
 - 963 636 Core 136, engine
 - 964 637 Core 137, engine
 - 965 638 Core 138, engine
 - 966 639 Core 139, engine
 - 967 640 Core 140, engine
 - 968 641 Core 141, engine
 - 969 642 Core 142, engine
 - 970 643 Core 143, engine
 - 971 644 Core 144, engine
 - 972 645 Core 145, engine
 - 973 646 Core 146, engine
 - 974 647 Core 147, engine
 - 975 648 Core 148, engine
 - 976 649 Core 149, engine
 - 977 650 Core 150, engine
 - 978 651 Core 151, engine
 - 979 652 Core 152, engine
 - 980 653 Core 153, engine
 - 981 654 Core 154, engine
 - 982 655 Core 155, engine
 - 983 656 Core 156, engine
 - 984 657 Core 157, engine
 - 985 658 Core 158, engine
 - 986 659 Core 159, engine
 - 987 660 Core 160, engine
 - 988 661 Core 161, engine
 - 989 662 Core 162, engine
 - 990 663 Core 163, engine
 - 991 664 Core 164, engine
 - 992 665 Core 165, engine
 - 993 666 Core 166, engine
 - 994 667 Core 167, engine
 - 995 668 Core 168, engine
 - 996 669 Core 169, engine
 - 997 670 Core 170, engine
 - 998 671 Core 171, engine
 - 999 672 Core 172, engine
 - 1000 673 Core 173, engine

Tim Hall read Savannah Georgia

Honeywell



Gulfstream
A GENERAL DYNAMICS COMPANY

flightglobal.com

FLIGHT
INTERNATIONAL

